K0000	Check and Adjustment Procedures

Follow these general procedures during check and adjustment:

(1) Adjust the oscilloscope before measurement if the procedure requires such equipment.
(2) Unless otherwise noted, adjust readings, such as voltage or pressure levels, to the mid-value of a specified range.
(3) Record the data during both checks and adjustments.
(4) Handle the master skew tape carefully. Always remove the write-enable ring during check and adjustment. Operation requires file protection.

FMT Check and adjustment item	Map No.	Period
Power supply voltage	K0001	Annually
Microprocessor clock adjustment	K0002	Annually
Formatter clock adjustment	K0003	Annually

MTU Check and adjustment items	Map No.	Period
Power supply voltage	K0100	Annually
Clock pulse check	K0101	Annually
Capstan tachometer output	K0110	Every 3 months
Azimuth	K0120	Every 6 months
Read signal level (6250/1600 bpi MTU)	K0130	Every 6 months
Read signal level (1600/800 bpi MTU)	K0140	Every 6 months
Read and write skew (1600/800 bpi MTU)	K0150	When necessary
Write voltage	K0160	Annually
Erase effect	K0170	When necessary
Hose and tube	K0180	When necessary
Pressure and vacuum level	K0190	When necessary
Vacuum blower and motor pulleys	K0191	When necessary
Air supply unit belt tension	K0200	When necessary
BOT/EOT detection circuit	K0210	Annually
Low tape detection circuit	K0220	Annually
Tape loop position detection circuit	K0240	Annually
File protect mechanism	K0260	Every 6 months
Autocleaner	K0290	When necessary
Capstan Motor Adjustment	L0130*	

K0001	FMT Power Supply Voltage Check and Adjustment

(1) Use a digital voltmeter to check and adjust the following DC voltage levels on FMT #0 for a single FMT system.

Voltage	Range
+5V	+4.75 to +5.25V. Adjust the +5V ADJ on the power supply unit as required.
-5.2V	-5.46 to -4.94 V. Adjust the -5.2V ADJ on the power supply unit as required.

(2) Check FMT #1 for a dual FMT system. Adjust DC voltage levels, if necessary, to the same range as that for FMT #0.

K0002	FMT Microprocessor Clock Adjustment

1. Remove PCA 512636U and install extender. Reinstall the PCA on the extender.

2. Turn the FMT power on and initialize the FMT using a field tester. (Set the switches to $FX and toggle the CNT switch.)

3. Refer to Figure K.1 and the clock adjustment table. Adjust the clock width by moving the shorting pins. The shorting pin installed across 02/03 in circuit AF4 allows for a narrow pulse. The pin across 13/14 allows for a wider pulse.

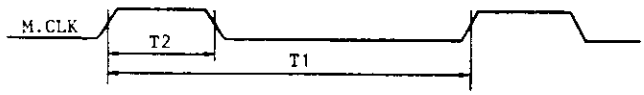
4. After adjustment is completed, write any data into register address ($3F) using the field tester. Then, check to ensure that the data is properly written.

Example:

a.	$B2	toggle CNT	
	$AA	toggle SSS	Write data X'AA'.
	$3F	toggle SSS	
	$3F	toggle CNT	Check the data written.
b.	$B2	toggle CNT	
	$55	toggle SSS	Write data X'55'.
	$3F	toggle SSS	
	$3F	toggle CNT	Check the data written.

5. After checking that data is properly written in step 4, turn off FMT power, remove the extender, and reinstall printed circuit board 512636U.

K0002	FMT Microprocessor Clock Adjustment

Clock name	Check point	Allowable range(nS)	Delay circuit	Delay tap	Standard tap	Method		Remarks
M.CLK	1A05BB8	T1 (208 10) T2: 35-45	AF4	02 04 > 03 05 07 > 06 09 11 > 10 12 14 > 13	07-06	Use one of delay taps.	Narrow pulse width The pulse width can be adjusted at a tap rate of 6 of to 10ns.	Fig. K.1
			AF6	02 04 > 03 05 07 > 06 09 (11) > 10	02-03	Use one of delay taps.	Wide pulse width	
								

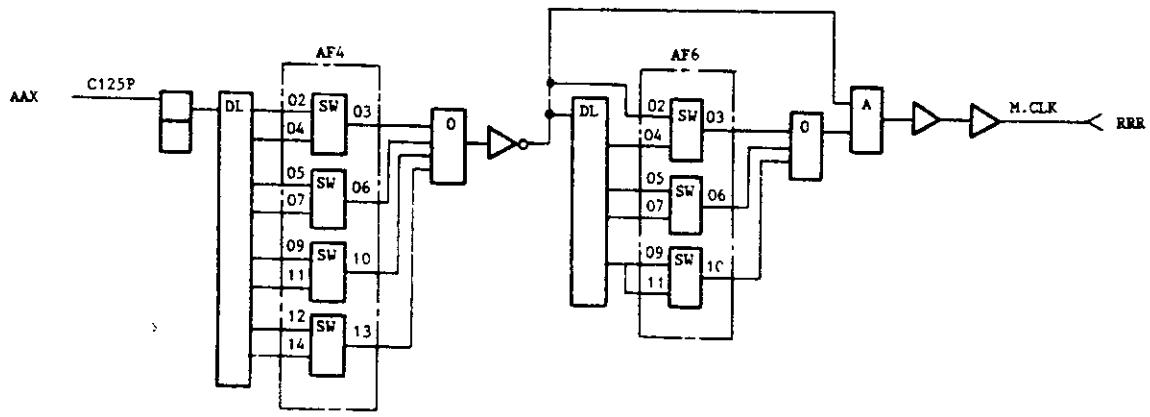


Figure K.1 FMT microprocessor clock adjustment circuit

K0003	FMT Clock Adjustment

- o The FMT contains six crystal oscillators that correspond with various tape speeds and recording densities.
- o The crystal oscillator outputs are frequency-divided and shaped to generate five read/write formatter clocks signals.
- o The formatter clocks can be roughly classified into clocks for the GCR-200ips mode and other modes. Also, the adjustment procedures are partially overlapped.

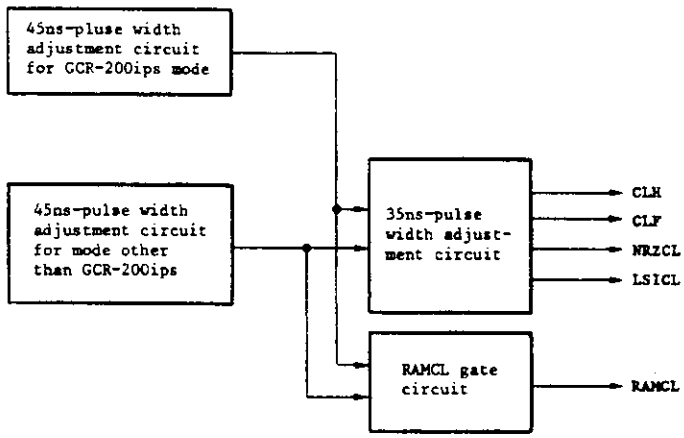


Figure K.2 Formatter clock width adjustment circuit

I. GCR-200ips mode adjustment procedure

1. Remove PCA 512636U and install the extender. Reinstall the PCA on the extender.
2. Turn the FMT power on and set the FMT microprocessor to the step mode using a field tester. Set the switches to $E8 and toggle the CNT switch.
3. Set the FMT to the GCR-200ips mode.

a.	$B2	toggle CNT	
	$08	toggle SSS	(GCR mode setting)
	$64	toggle SSS	
b.	$B2	toggle CNT	
	$06	toggle SSS	(200 IPS mode setting)
	$74	toggle SSS	

4. Refer to Figure K.3 and the Formatter Clock Adjustment Tap-1. Adjust the formatter clock width for the GCR-200ips mode by moving the shorting pins. The shorting pin installed across 02/03 in circuit AF4 allows for a narrow pulse. The pin across 13/14 allows for a wider pulse.

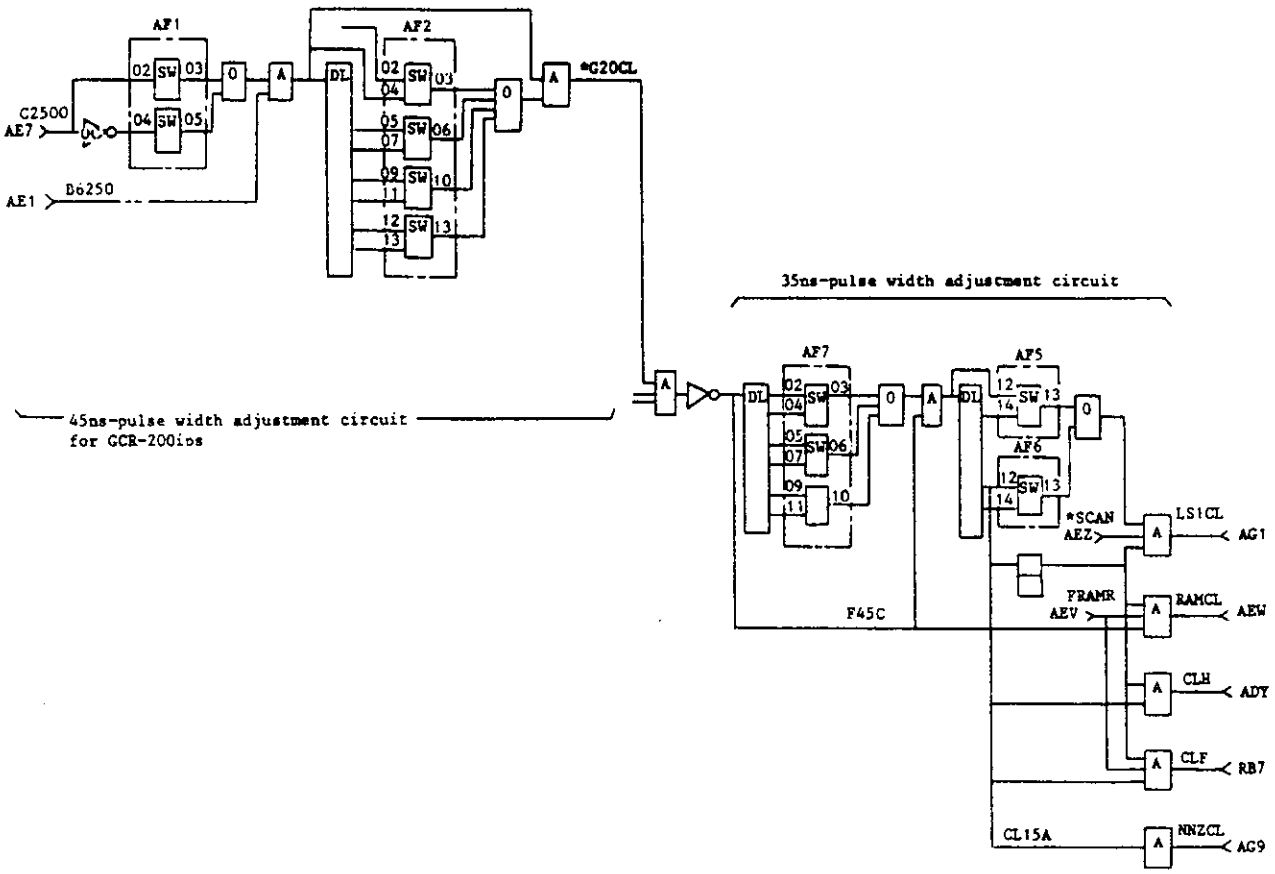
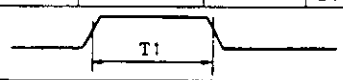
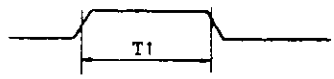
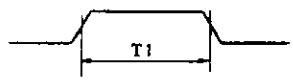


Figure K.3 Formatter clock adjustment circuit for GCR-200ips mode

Table K.1 Formatter clock adjustment tap-1

Clock name	Check point	Allowable range(nS)	Delay circuit	Delay tap	Standard tap	Method		Remarks
RAMCL	1A05AEW	T1: 45 - 49	AF1	02 - 03	02 - 03	Use one of the delay taps under the delay circuit AF7 05-06 shorted-circuit.		Fig. K.3
				04 - 05			Phase inversion	
			AF2	02 04 > 03	05 - 06		Narrow pulse width	
				05 07 > 06			The pulse width can be adjusted at a tap rate of 6 to 7.5ns.	
				09 11 > 10			Wide pulse width	
				12 14 > 13				
								
CLH CLF NRZCL	1A05ADY 1A05BB7 1A05AG9	T1: 35 - 39	AF7	02 04 > 03	05 - 06	After the RAMCL gate circuit is adjusted, use one of the delay taps.	Narrow pulse width	
				05 07 > 06			The pulse widthe can be adjusted at a tap rate of 6 to 7.5ns.	
				09 11 > 10			Wide pulse width	
								
LSICL	1A05AG1	T1: 35 - 39	AF5	12 14 > 13	-	Fixed at delay tap AF6 12 or 13.	Check to see that the pulse width is within the allowable range.	
			AF6	12 14 > 13	12 - 13			
								

II. Modes other than GCR-200ips

1. Remove the PCA 512636U and install the extender. Reinstall the PCA on the extender.

2. Turn the FMT power on. Set the FMT microprocessor to the step mode using a field tester and reset the system as listed below.

a. $E8 toggle CNT (Step mode)

b. $F0 toggle CNT (Reset) Also sets the system to the NRZ-50ips mode.

3. Refer to Figure K.4 and the Formatter Clock Adjustment Tap-2. Adjust the formatter clock width by moving the shorting pins. The shorting pin installed across 02/03 in circuit AF4 allows for a narrow pulse. The pin across 13/14 allows for a wider pulse.

4. After adjustment is completed, cancel the step mode by setting the field tester swtiches to $E0 and toggling CNT.

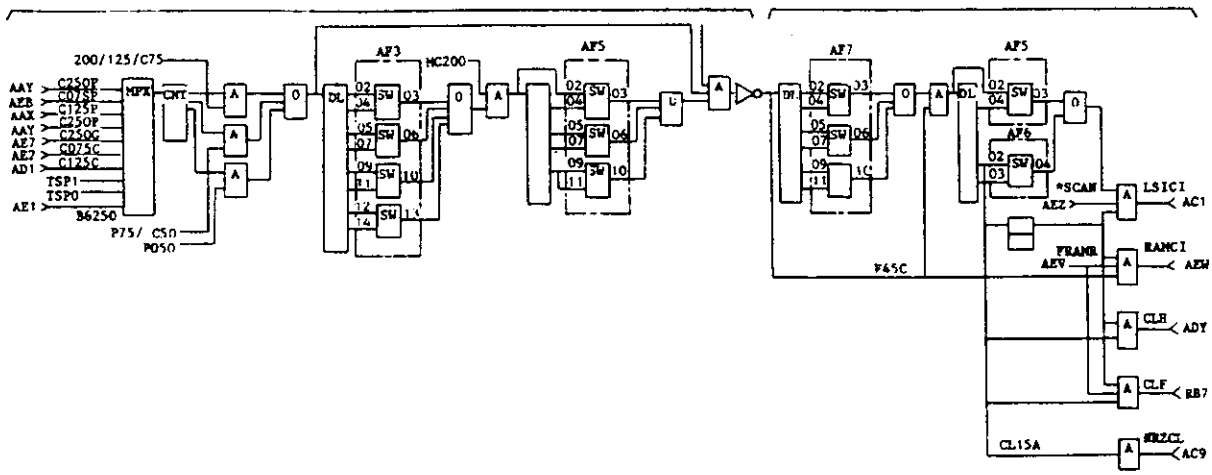


Figure K.4 Formatter clock adjustment circuit for other than GCR-200ips mode

K0003	FMT Clock Adjustment

Table K.2 Formatter clock adjustment tap-2

<table>
<tr><th>Clock name</th><th>Check point</th><th>Allowable range(nS)</th><th>Delay circuit</th><th>Delay tap</th><th>Standard tap</th><th colspan="2">Method</th><th>Remarks</th></tr>
<tr><td rowspan="3">RAMCL</td><td rowspan="3">1A05AEW</td><td rowspan="3">T1:
45 - 49</td><td rowspan="2">AF4</td><td>02
04 > 03
05
07 > 06
09
11 > 10
12
14 > 13</td><td rowspan="2">06 - 07</td><td rowspan="2">Use one of the delay taps.</td><td>Narrow pulse width

The pulse width can be adjusted at a tap rate of 6 to 7.5ns.</td><td rowspan="3">Fig. K.4</td></tr>
<tr><td>AF6</td><td>02
04 > 03
05
07 > 06
09 - 10</td><td>02 - 03</td><td>Use one of the delay taps.</td><td>Wide pulse width</td></tr>
<tr><td colspan="6"> 
</td></tr>
<tr><td>CLH
CLF
NARZCL
LSICL</td><td colspan="5"></td><td colspan="2">Referring to Fig. K.1 and Table K.1, check to see that the pulse width has been set in the GCR-200ips mode. Also, make adjustment as required. However, be sure to recheck to see that the pulse width is properly set in the GCR-200ips mode.</td><td>Figs. K.3 and K.4</td></tr>
</table>

K0100	MTU Power Supply Unit Check and Adjustment

Check and adjust the following items on the MTU with a digital voltmeter. Check and adjustment points are shown in Figures K.5 through K.7.

Voltage	Location	Range	Adjustment position
+ 5 V	MTU logic gate + 5 V ... Check point PCA 1A02 0 V ... Check point	+5 V ±2%	Potentiometer RV1
+12 V	Write/read PCA CHWR pin 1	+12 V ±8%	
- 6 V	Write/read PCA CHWR pin 5	-6 V ±8%	
±13 V	Gate part 1A01 +13 V ... ADV -13 V ... AEV	±13 V ±8%	

Follow these steps when replacing PCA 1A02:

(1) Check the +24 V across points 6 and 7 (GND), the -24 V across points 8 and 7 (GND), and the +11 V voltage across points 4 and 5 (GND) shown in Figure K.7 (TRM 41).

(2) Adjust variable resistor RV1 on PCA 1A02 to satisfy that the voltage across +5 V check point and GND is 5 V ± 2%.

(3) Check the +5 V and confirm +12 V, -6 V, ±13 V are within allowable ranges in the table above.

(4) If the requirements of ±24 V and +11 V are not satisfied, replace the power supply unit.

(5) If the requirements of +5 V, +12 V, -6 V and ±13 V are not satisfied, replace PCA 1A02.

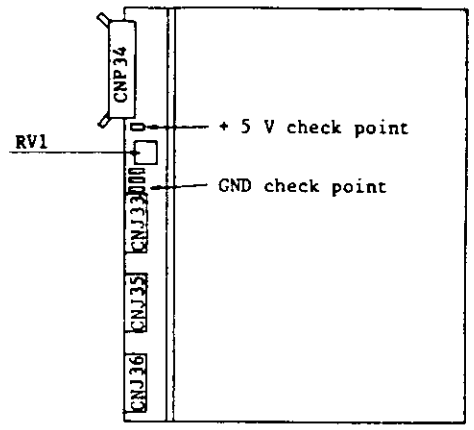


Figure K.5 PCA 1A02 in the MTU

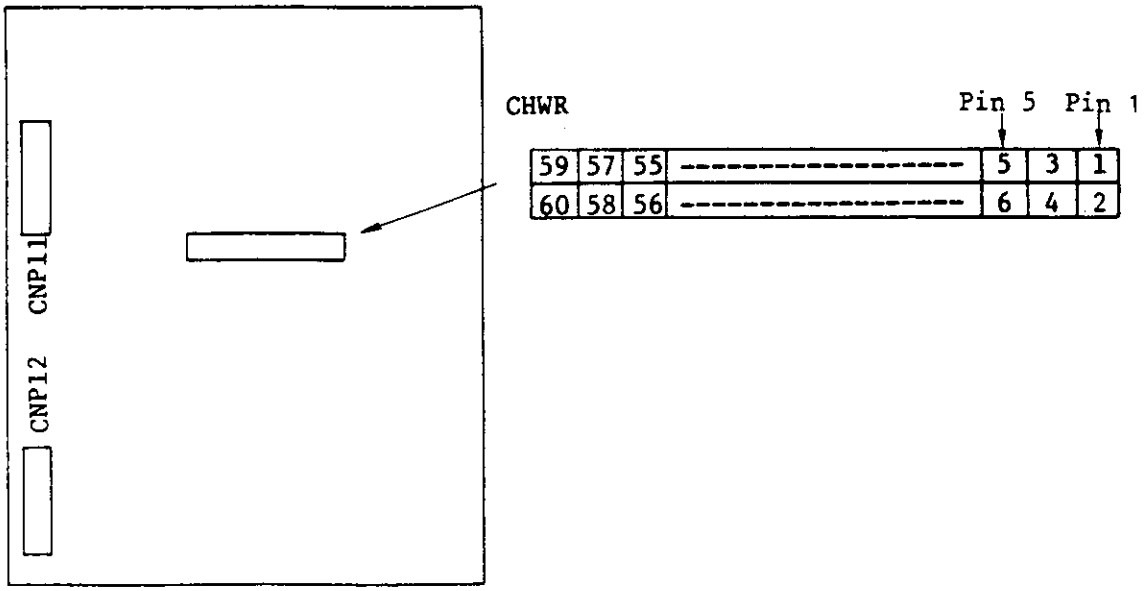


Figure K.6 Write/read amplifier PCA

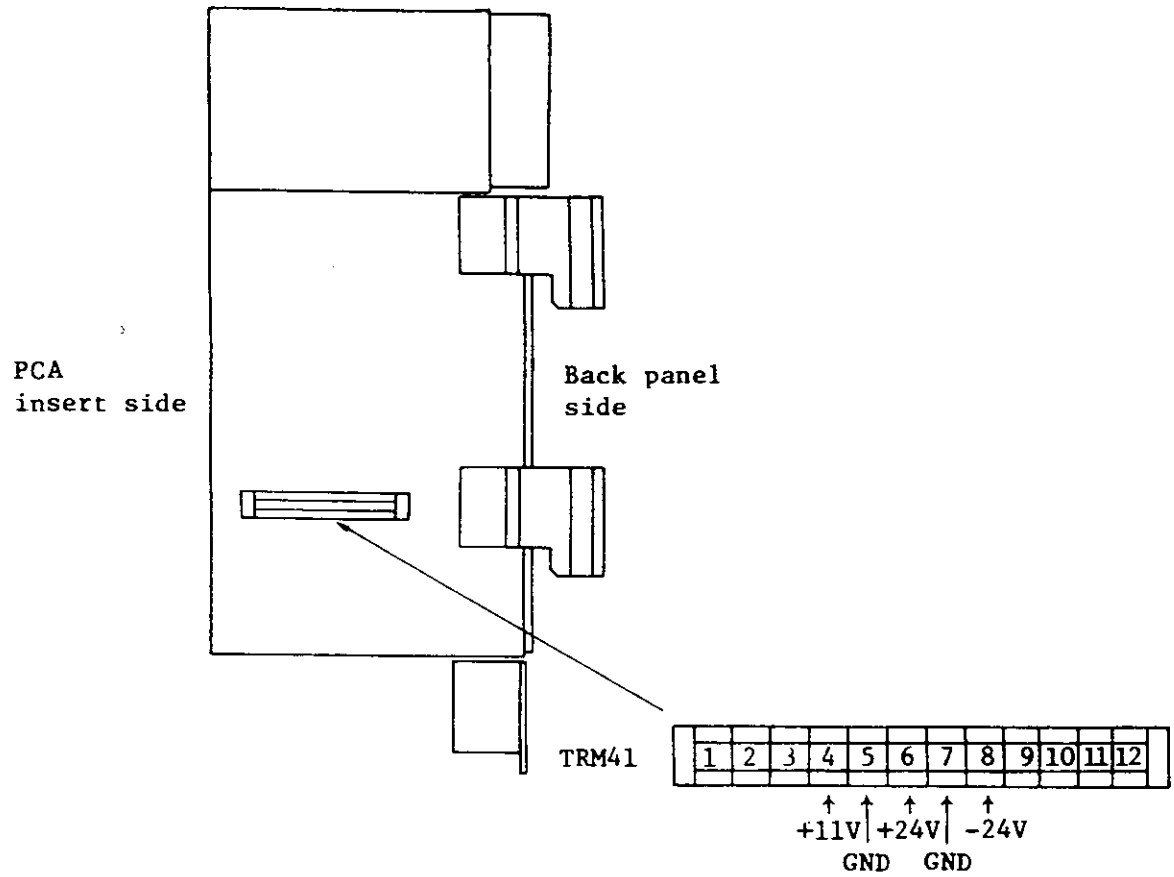


Figure K.7 ±24 V and +11 V check points

K0101	Clock Pulse Check

Check the following clock pulses with an oscilloscope.

Clock pulses (see below)	Check point (MTU logic gate)	Allowable range
CL8M	1A06 BB8	T_0 = 125 ns ±1.5% Duty (Tw_0/T_0) = 50 ± 15%
CL1MA	1A06 BAX	T1 = 1 μs ± 1.5%
DSPCL	1A06 ALV	T2 = 500 ns ± 50 ns
PTYCL	1A06 BBX	T3 = 750 ns ± 50 ns Tw_1, Tw_2, Tw_3 + 62.5 ns ± 20 ns

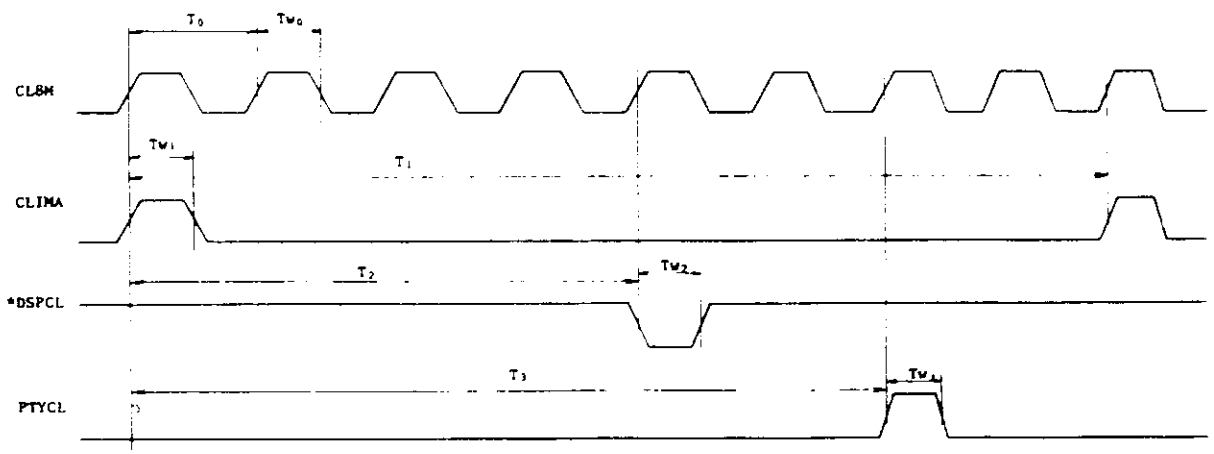


Figure K.8 Clock pulses

K0110	Capstan Tachometer Output Check

I. Duty Cycle Check

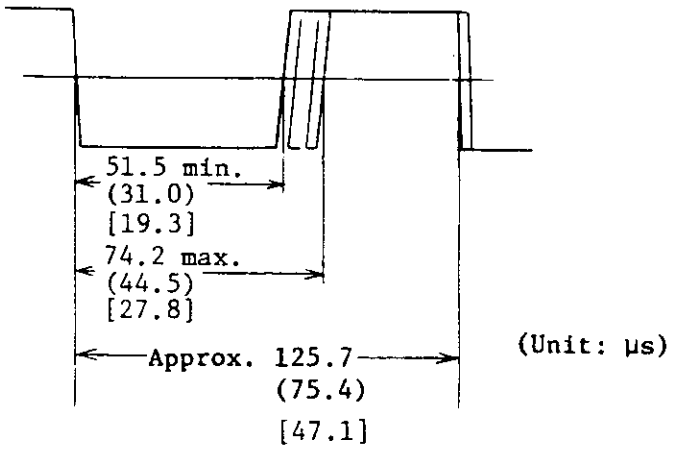
(1) Connect a field tester to the MTU at 1C05 and load a magnetic tape.

(2) Use an oscilloscope to observe CPA and CPB during forward (command code: $41) and backward (command code: $41) direction.

(3) Check that both directions of motion satisfy the requirements shown in Figure K.9

Capstan tachometer	Measurement location MTU logic gate motherboard	Requirement
CPA CPB	1A01 AA6 1A01 AB6	Shown in Fig K.9

(4) If the requirements as shown on Figure K.9 are not correct, see paragraph III for adjusting the duty cycle.



Notes:
(1) All values are in microseconds (μs).
(2) Values designated by ( ) are for 125 ips model.
Values designated by [ ] are for 200 ips model.

Figure K.9 Duty cycle check

II. Phase Check

A. Measurement in running forward direction (field tester command code $01) toggle the SSS switch to start motion and toggle the SSS switch again to stop motion.

(1) Run the tape in the forward direction.

(2) Observe CPA and CPB simultaneously.

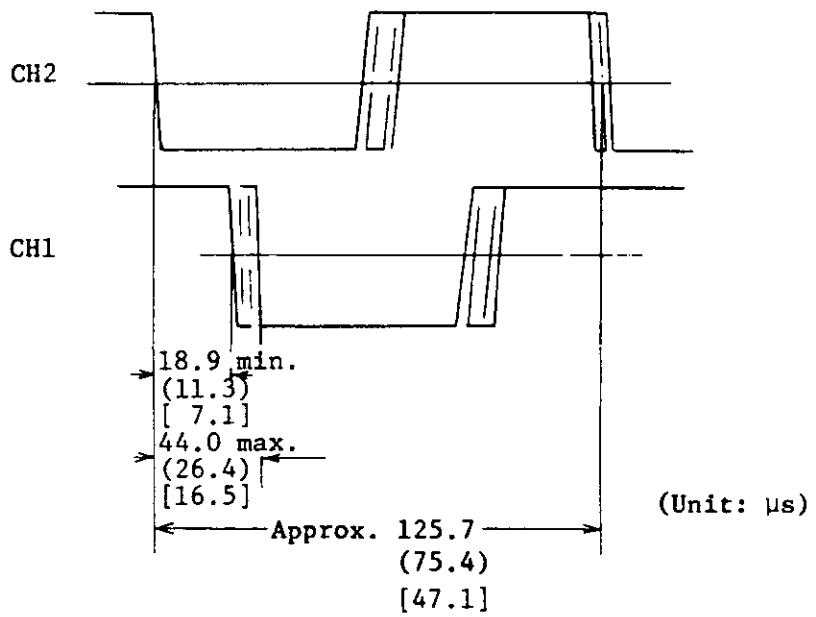
(3) Check that the requirements shown in Figure K.10 are satisfied when triggered by trailing edge of the pulse CPB.

B. Measurement running in backward direction (field tester command code $41).

(1) Run the tape in the backward direction.

(2) Measure at the same terminals as in forward running, except reverse the oscilloscope leads.

(3) Check that the measured values satisfy the requirements shown in Figure K.10.



Notes:
(1) All values are in microseconds (s)
(2) Values designated by ( ) are for 125 ips model.
Values designated by [ ] are for 200 ips model.

Figure K.10 Phase check

K0110	Capstan Tachometer Output Check

III. Capstan High-Speed Rotation Check

(1) Remove the magnetic tape.

(2) Connect the field tester to the MTU at connector 1C05. Set switches 0 through 7 to $9D and toggle the SSS switch. The capstan motor will rotate at high speed. Check the tachometer CPA and CPB.

(3) If an error occurs, Unit check LED is illuminated and error code is displayed. In this case, the capstan motor rotates at an unstable speed.

(4) If the capstan pulse CPA or CPB does not satisfy the requirements, adjust the potentiometer that corresponds to CPA or CPB at capstan motor. (See Figure K.11.) However, never adjust the potentiometer unless the tests indicate a need to do so.

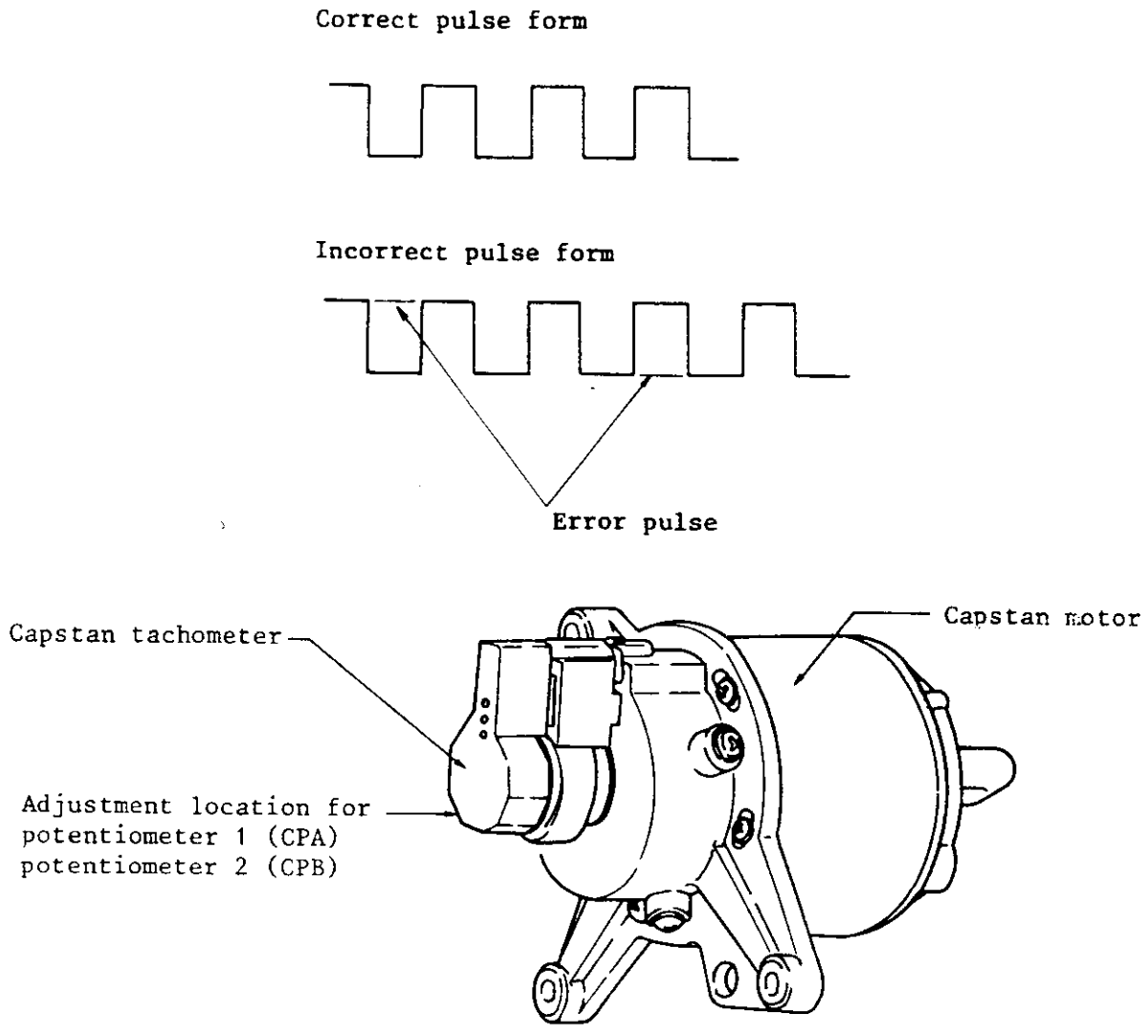


Figure K.11 Capstan high-speed rotation check

K0120	Azimuth Check

(1) Press the UNLOAD/REWIND button on the MTU front panel and remove the tape from the reel.

(2) Install master skew tape (P/N BM.BvMt 351d) and press LOAD/REWIND on the MTU control panel.

(3) Connect a dual-trace oscilloscope to the Write/Read amplifier PCA, tracks 1 and 9, as shown in Figure K.12. The designations on the write/read amplifier PCA for tracks 1 through 9 are shown in Figure K.13. Five pins are associated with each track on the PCA. Connect the oscilloscope to pin #5.

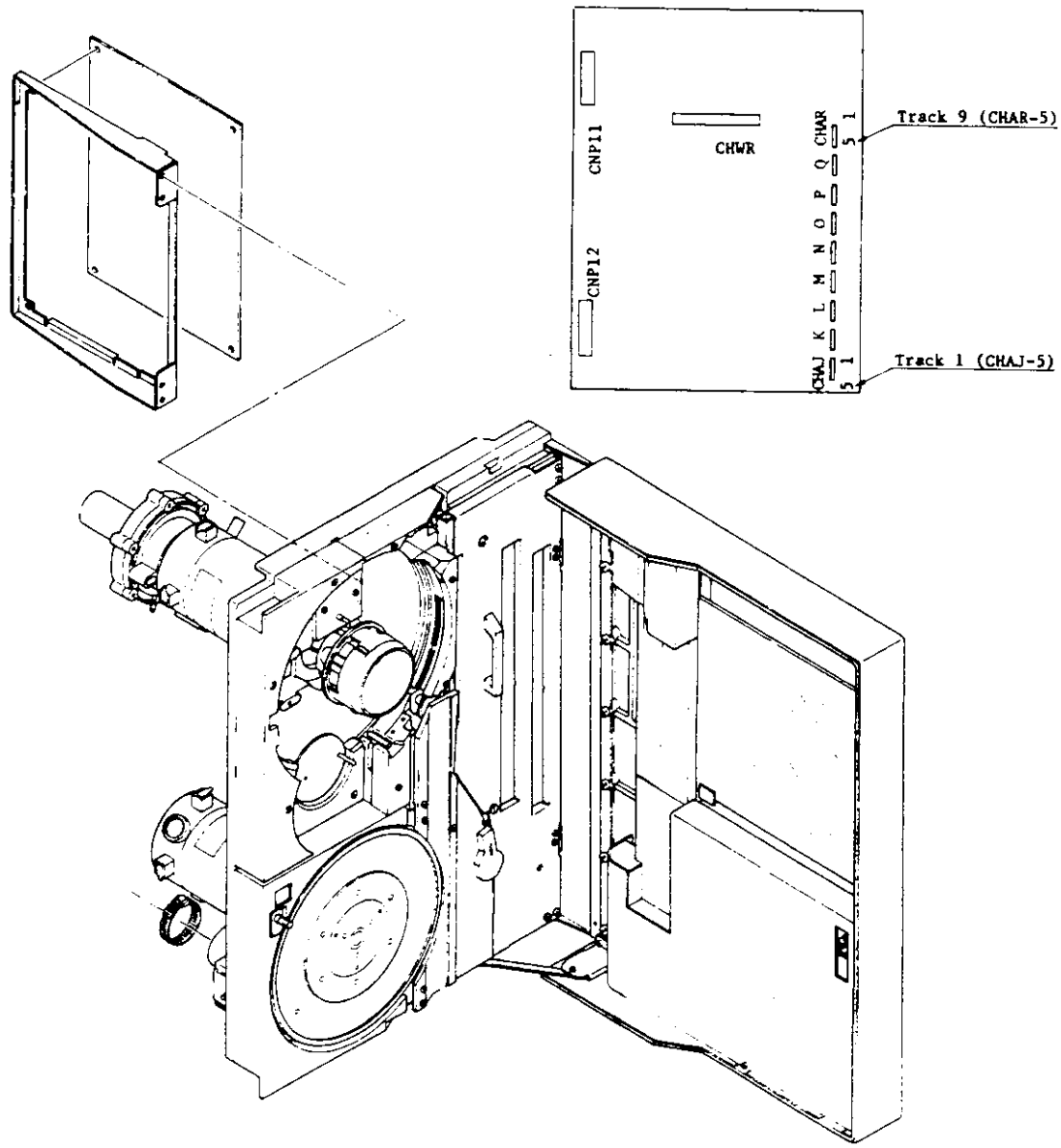
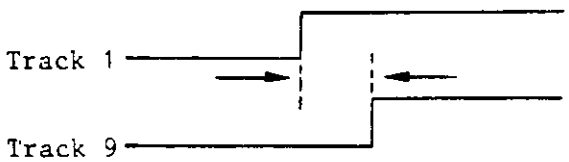


Figure K.12 Read/write amplifier PCA

(4) Set the field tester ONL/OFL switch to OFL. Set the field tester switches S0 through S7 to $E2 for 6250/1600 bpi;
(or)
Set the field tester switches to $E0 for 1600/800 bpi. After setting the switches, toggle the SSS switch.

(5) Use Phase Encode (PE) mode, (1600 bpi) and set the field tester switches for forward (FWD) read using Command code $01. Toggle the SSS switch.

(6) Check that the phase difference with the read output of tracks 1 and 9 shown in Figure K.13 satisfies the requirements of FWD skew in the table.



Phase difference between rising waveforms (μs) should meet skew requirements in next table

Track number	Designation on write/read amplifier PCA
1	CHAJ
2	CHAK
3	CHAL
4	CHAM
5	CHAN
6	CHAO
7	CHAP
8	CHAQ
9	CHAR

Figure K.13 Phase difference of tracks 1 and 9

K0120	Azimuth Check

FWD and BWD skew requirements. To use this table, verify model number of unit to be tested. Use skew requirement for FWD and BWD directions (shown in right-hand column) for that model.

Model Number	Specification	Check between	Requirement: skew must be within
M2435L1/L2 M2432L	125 ips 6250/1600 bpi (WRHMU)	Track 1 versus 2 thru 9	FWD 0.6 µs BWD 1.0 µs
M243L1/L2 M2430L	75 ips 6250/1600 bpi (WRIMU)	Track 1 versus 2 thru 9	FWD 1.0 µs BWD 1.6 µs
M2433L M2433L	125 ips 1600/800 bpi (WRJMU)	Track 1 versus 2 thru 9	FWD 0.4 µs BWD 0.4 µs
M2439L1/L8	125 bpi 6250/1600/800 bpi (WRMMU)	Track 1 versus 2 thru 9	FWD 0.4 µs BWD 0.4 µs
M2436L1/L2 & L8 M2436N1/N8	200 ips 6250/1600 bpi (WRHMU)	Track 1 versus 2 thru 9	FWD 0.4 µs BWD 0.6 µs

(8) Check the FWD skew of tracks 2 through 8 against track 1. Verify that skew is within the values shown in the table.

(9) Initiate the backward (BWD) operation by setting field tester switches to $41.

(10) Verify that skew is within the values shown in the table for BWD operation. Check the BWD skew of tracks 2 through 9 against track 1.

(11) If either FWD or BWD operations do not satisfy the requirements in the table, adjust the azimuth according to instructions in the K0121.

K0121	Azimuth Adjustment

(1) Perform the dynamic alignment procedures in L0130.

(2) Connect an oscilloscope to tracks 1 and 9 as described in K0120 and observe the phase difference in the rising waveforms. Use track 1 as the trigger. Adjust the phase of the two waveforms using the amzimuth adjusting screw A (Figure K.14) until the requirements listed in the table (K0120) are met.

(3) Check that track 2 through 8 (compared to track 1) meet the same requirements.

(4) Observe backward (BWD) operation. If the requirements in the table of K0120 are satisfied, no adjustment is needed.

(5) If the requirements are not satisfied (6250/1600 bpi MTU), turn the upper capstan alignment adjusting screw until the backward skew is correct. if track 9 leads track 1, turn the screw counterclockwise. If track 1 leads track 9, turn the screw clockwise.
Note: Rotation of the azimuth adjusting screw must not exceed 1/4 turn.

(6) If any adjustments are made, recheck the forward and backward skew.

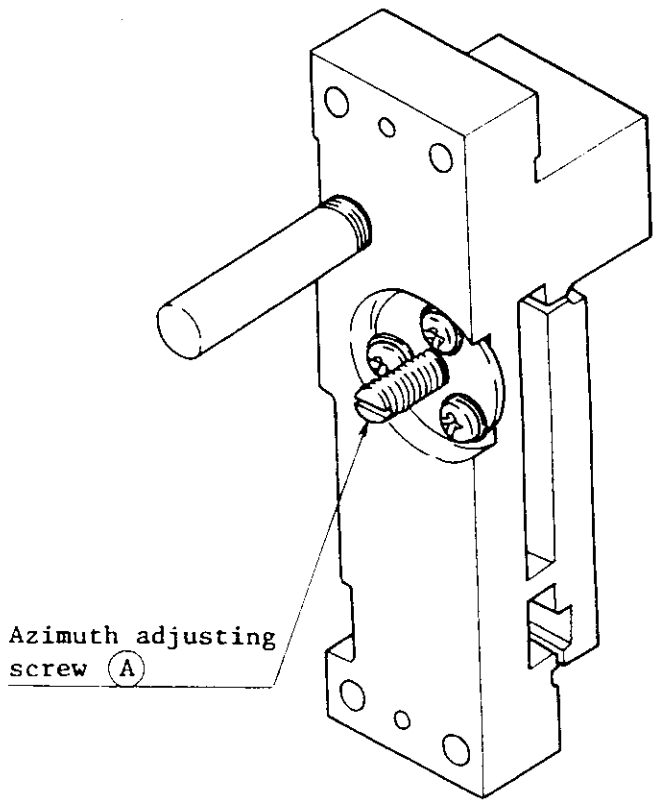


Figure K.14 Head block (rear of the MTU)

K0130	Read Signal Check and Adjustment, and Head Replacement Specification (6250/1600 bpi MTU)

This section provides instructions for checking and adjusting the read-signal levels for the following modes:

- o Low-speed phase encode
- o High-speed phase encode
- o Low-speed group code recording (GCR)
- o High-speed GCR.

Ensure that the conditions listed below have been satisfied before initiating read-signal checkout:

(1) Clean the read/write and erase heads.

(2) Install an SRM3200 tape or a tape of equivalent quality. Push the LOAD/REWIND button on the MTU front panel.

(3) Verify that the column vacuum level is adjusted to specifications. (See K0190.)

(4) Ensure that capstan alignment is normal. (See L0130.)

If any adjustments in the following procedures cannot be performed, or if criteria cannot be satisfied, replace the head and perform checks I through IV. See L0010 for head replacement. If adjustments fail after head replacement, see A7000.

I. Low-Speed Phase Encode Checkout

(1) Set field tester switches S0 through S7 to $1E, and toggle the CNT switch to select the register address.

(2) Set the field tester switches S0 through S7 to $EA, and toggle the SSS switch to set the read mode, tape speed, and density. (For models M2431L and M2433L, use $E8 setting.)

(3) Set the field tester switches S0 through S7 to $FA, and toggle the SSS switch to set the slice level to 100%.

(4) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch to set the write, low-speed, phase encode mode. Lamps 0 through 8 will come on and should be semi-luminous (barely glowing).

(5) Adjust the corresponding potentiometers (RV1R through RV1J) in Figure K.15, if necessary, to obtain semi-luminous status for lamps 0 through 8. Toggle the SSS switch to stop the tape.

(6) Set the field tester switches S0 through S7 to $F9, and toggle the SSS switch to set the slice level to 90%.

(7) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch to set the write, low-speed, phase encode mode. Lamps 0 through 8 should be brightly lit.

(8) Adjust the corresponding potentiometers shown in Figure K.15, if necessary. Toggle the SSS switch to stop the tape.

(9) Set the field tester switches S0 through S7 to $FB, and toggle the SSS switch to set the slice level to 110%.

(10) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch. Lamps 0 through 8 should be off.

(11) Adjust the corresponding potentiometers shown in Figure K.15, if necessary. Toggle the SSS switch to stop the tape.

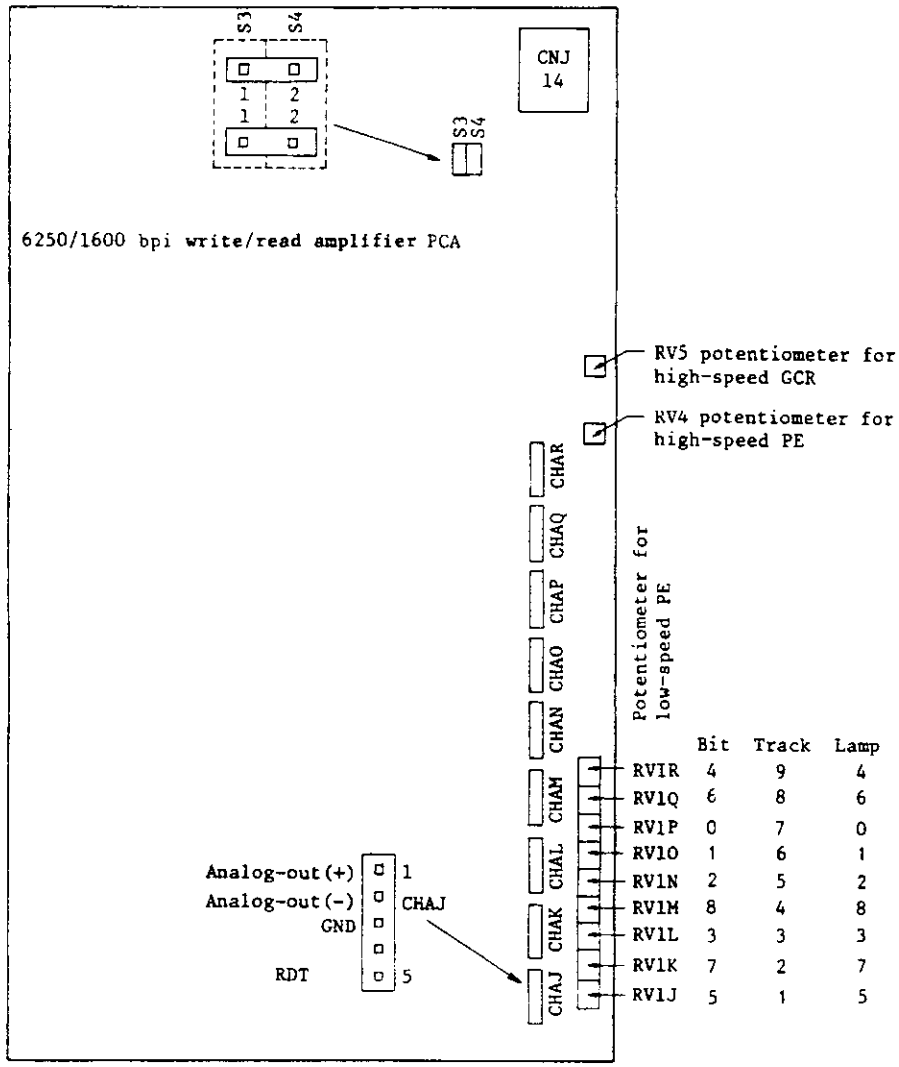


Figure K.15 Potentiometers and check terminals for lamps 0 through 8 on write/read amplifier PCA

II. High-Speed Phase Encode Checkout

(1) Set the field tester switches S0 through S7 to $1E, and toggle the CNT switch to select the register address.

(2) Set the field tester switches S0 through S7 to $EC, and toggle the SSS switch to set the tape to the high-speed mode.

(3) Set the field tester switches S0 through S7 to $FA, and toggle the SSS switch to set the slice level to 100%.

(4) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode.

(5) Adjust potentiometer RV4 shown in Figure K.15 so that four or more of lamps 0 through 8 are lit. After adjustment, toggle the SSS switch to stop the tape.

(6) Set the field tester switches S0 through S7 to $F5, and toggle the SSS switch to set the slice level to 80%.

(7) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode. Lamps 0 through 8 should be lit.

(8) Adjust potentiometer RV4 if necessary. Toggle the SSS switch to stop the tape.

(9) Set the field tester switches S0 through S7 to $F7, and toggle the SSS switch to set the slice level to 125%.

(10) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode. Lamps 0 through 8 should be off.

(11) Adjust potentiometer RV4 if necessary. Toggle the SSS switch to stop the tape.

III. Low-Speed GCR Checkout

(1) Set the field tester switches S0 through S7 to $1E, and toggle the CNT switch to set the register address.

(2) Set the field tester switches S0 through S7 to $EA, and toggle the SSS switch to set the tape to the low-speed mode.

(3) Set the field tester switches S0 through S7 to $F3, and toggle the SSS switch to set the slice level to 51%.

(4) Set the field tester switches S0 through S7 to $C6, and toggle the SSS switch to set the DGC amplifier. Toggle the SSS switch again to stop the tape.

(5) Set the field tester switches S0 through S7 to $8B, and toggle the SSS switch for write, low-speed GCR mode. Lamps 0 through 8 should be on.

(6) Toggle the SSS switch to stop the mode.

(7) Set the field tester switches S0 through S7 to $F5, and toggle the SSS switch to set the slice level to 80%.

(8) Set the field tester switches S0 through S7 to $8F, and toggle the SSS switch to perform SAGC operation in write, low-speed, GCR mode. Lamps 0 through 8 should be on.

(9) Toggle the SSS switch.

(10) Set the field tester switches S0 through S7 to $F7, and toggle the SSS switch to set the slice level to 125%.

(11) Set the field tester switches S0 through S7 to $8B, and toggle the SSS switch for write, low-speed, GCR mode. Lamps 0 through 8 should be off.

(12) Toggle the SSS switch.

(13) Set the field tester switches S0 through S7 to $F3, and toggle the SSS switch to set the slice level to 51%.

(14) Set the field tester switches S0 through S7 to $41, and toggle the SSS switch for read backward in the low-speed, GCR mode. Lamps 0 through 8 should be on.

(15) Toggle the SSS switch.

IV. High-Speed GCR Checkout

(1) Set the field tester switches S0 through S7 to $1E, and toggle the CNT switch to set the register address.

(2) Set the field tester switches S0 through S7 to $EA, and toggle the SSS switch to set the tape to the low-speed mode.

(3) Set the field tester switches S0 through S7 to $8F, and toggle the SSS switch for write, low-speed GCR mode. After a few seconds, toggle the SSS switch again to stop the tape.

(4) Set the field tester switches S0 through S7 to $EE, and toggle the SSS switch to set the tape to high-speed mode.

(5) Set the field tester switches S0 through S7 to $FA, and toggle the SSS switch to set the slice level to 100%.

(6) Set the field tester switches S0 through S7 to $8B, and toggle the SSS switch for write, high-speed GCR mode.

(7) Adjust potentiometer RV5 in Figure K.15 so that four or more of lamps 0 through 8 are on. Toggle the SSS switch after adjustment to stop the tape.

(8) Set the field tester switches S0 through S7 to $F4, and toggle the SSS switch to set the slice level to 64%.

(9) Set the field tester switches S0 through S7 to $8B, and toggle the SSS switch for write, high-speed, GCR mode. Lamps 0 through 8 should be lit.

(10) Adjust potentiometer RV5, if necessary, so that lamps 0 through 8 are lit. Toggle the SSS switch to stop the tape.

(11) Set the field tester switches S0 through S7 to $F7, and toggle the SSS switch to set the slice level to 125%.

(12) Set the field tester switches S0 through S7 to $8B, and toggle the SSS switch for write, high-speed, GCR mode. Lamps 0 through 8 should be off.

(13) Adjust potentiometer RV5, if necessary, so that lamps 0 through 8 are off, and then toggle the SSS switch to stop the tape.

(14) Set the field tester switches S0 through S7 to $F3, and toggle the SSS switch to set the slice level to 51%.

(15) Set the field tester switches S0 through S7 to $42, and toggle the SSS switch to read backward, high-speed, GCR mode. Lamps 0 through 8 should be on.

(16) Adjust potentiometer RV5, if necessary, until lamps 0 through 8 are on.

(17) When read-signal checks and adjustment are completed, toggle the SSS switch to terminate the test.

(18) Press the LOAD/REWIND button on MTU front panel to rewind the tape.

K0140	Read Signal Check and Adjustment, and Head Replacement Specification (1600 800 bpi MTU)

This section provides instructions for checking and adjusting the read-signal levels for the following modes:

- o Nonreturn to zero I (NRZI)
- o Low-speed phase encode
- o High-speed phase encode.

Ensure that the conditions listed below have been satisfied before initiating read-signal checkout:

(1) Clean the read/write and erase heads.

(2) Install an SRM3200 tape or a tape of equivalent quality. Push the LOAD/REWIND button on the MTU front panel.

(3) Verify that the column vacuum level is adjusted to specifications. (See K0190.)

(4) Ensure that capstan alignment is normal. (See L0130.)

If adjustments in the following procedures cannot be performed, replace the head with a new one. See L0010 for head replacement.

I. NRZI Check and Adjustment

(1) Set field tester switches S0 through S7 to $81, and toggle the SSS switch for write 800 fci in the NRZI mode.

(2) Adjust potentiometers RV1J through RV1R, shown in Figure K.16, so that terminals CHAJ pin 1 through CHAR pin 1 develop 2.0 Vp-p $\pm$ 10% against ground. Use an oscilloscope for these checks.

II. Low-Speed Phase Encode Checkout

(1) Set field tester switches S0 through S7 to $1E, and toggle the CNT switch to select the register address.

(2) Set the field tester switches S0 through S7 to $EA, and toggle the SSS switch to set the tape to low speed mode.

(3) Set the field tester switches S0 through S7 to $FA, and toggle the SSS switch to set the slice level to 100%.

(4) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch to set the write, low-speed, phase encode mode. Four or more lamps should come on will come on.

(5) If necessary, adjust potentiometer RV1. Toggle the SSS switch to stop the tape.

(6) Set the field tester switches S0 through S7 to $F5, and toggle the SSS switch to set the slice level to 80%.

(7) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch to set the write, low-speed, phase encode mode. Lamps 0 through 8 should be brightly lit.

(8) Toggle the SSS switch to stop the tape.

(9) Set the field tester switches S0 through S7 to $F7, and toggle the SSS switch to set the slice level to 125%.

(10) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch. Lamps 0 through 8 should be off.

(11) Toggle the SSS switch to stop the tape.

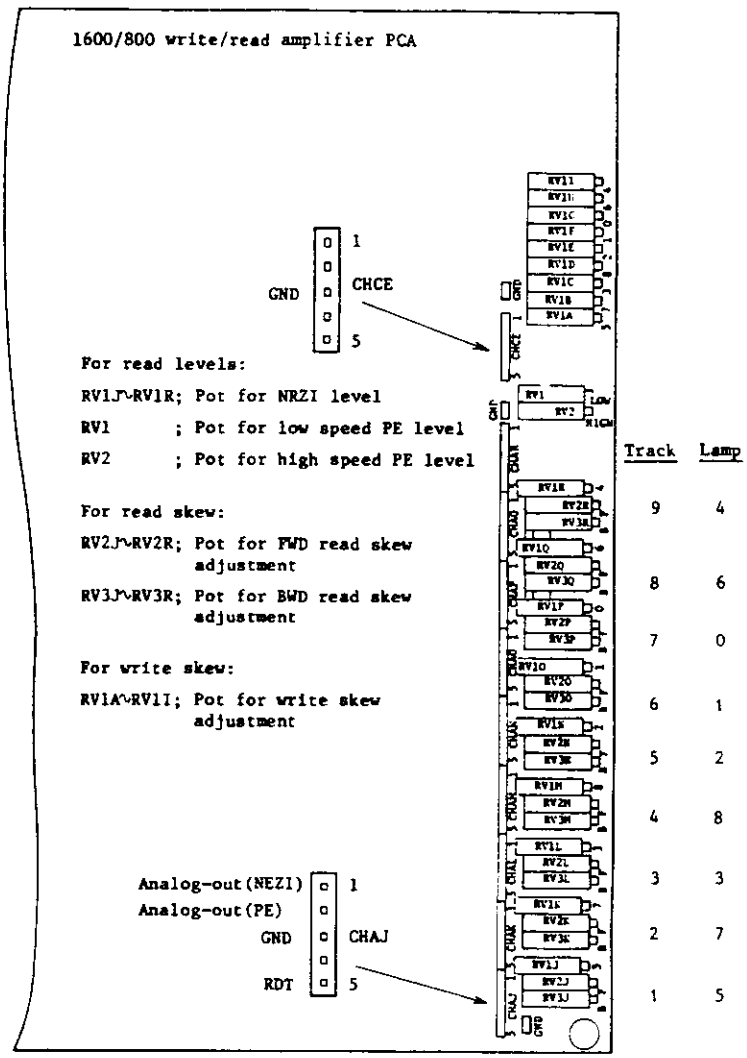


Figure K.16 Potentiometer and check terminals for lamps 0 to through 8 on the 1600/800 bpi write/read amplifier PCA

III. High-Speed Phase Encode Checkout

(1) Set the field tester switches S0 through S7 to $1E, and toggle the CNT switch to select the register address.

(2) Set the field tester switches S0 through S7 to $EC, and toggle the SSS switch to set the tape to the high-speed mode.

(3) Set the field tester switches S0 through S7 to $FA, and toggle the SSS switch to set the slice level to 100%.

(4) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode.

(5) Adjust potentiometer RV2 shown in Figure K.16 so that four or more of lamps 0 through 8 are lit. After adjustment, toggle the SSS switch to stop the tape.

(6) Set the field tester switches S0 through S7 to $F5, and toggle the SSS switch to set the slice level to 80%.

(7) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode. Lamps 0 through 8 should be lit.

(8) Toggle the SSS switch to stop the tape.

(9) Set the field tester switches S0 through S7 to $F7, and toggle the SSS switch to set the slice level to 125%.

(10) Set the field tester switches S0 through S7 to $89, and toggle the SSS switch for write, high-speed, phase encode mode. Lamps 0 through 8 should be off.

(11) Toggle the SSS switch to stop the tape.

K0150	Read and Write Skew Check and Adjustment (1600/800 bpi MTU)

I. Check and adjust the read skew by taking the following steps:

(1) Degauss the magnetic and erasing heads with the demagnetizer (eraser) and clean the heads.

(2) Mount a field tester.

(3) Load a standard skew adjustment tape. Check that the FILE PROTECT lamp on the operator panel is ON.

(4) Run the tape forward or backward in the NRZI mode.

Operation of the field tester is as follows:

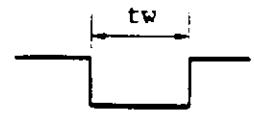
Table K.3 Field tester operation for read skew check and adjustment

Item	Field tester		Operation	Remarks
	Code	Toggle Switch		
1	$E0	SSS	Set to the NRZI mode	
2	$01	SSS	Forward running	The tape stops running if a beginning of tape or an end of tape marker is detected.
	$41	SSS	Backward running	

(5) Check that the pulse width developed at check terminal CHAN pin 5, for track 5 meets the value shown below. Adjust the pulse width for the specified value with RV2N (forward running) and RV3N (backward running).

See Figure K.16 (K0140) for location of potentiometers and check terminals.

Table K.4 Pulse width check and adjustment

Speed	Checked/adjusted pulse width (tw)	Observed waveform for CHAN, pin 5
75 ips (for 75/125 ips device)	3.0 µs ± 10%	
125 ips (for 125/200 ips device)	2.0 µs ± 10%	

(6) Check that the rise times of pulses for the respective tracks meet the specifications in Table K.5 for forward and backward running when the output levels of other tracks are observed. Use the output level of check terminal CHAN, pin 5 for track 5 as a reference.

(7) Adjust the rise times with RV2J to RV2R (except RV2N; forward running) and RV3J to RV3R (except RV3N; backward running).

Table K.5 Rise time check and adjustment (1)

Speed	Running direction	Variable resistors	Check terminals	Specification (Δt) (see Figure K.17)
75 ips	Forward	RV2J to RV2R (except RV2N)	CHAJ, pin 5 to CHAR, pin 5 (except CHAN, pin 5)	0.3 μs or less
	Backward	RV3J to RV3R (except RV3N)		
125 ips	Forward	RV2J to RV2R (except RV2N)		0.2 μs or less
	Backward	RV3J to RV3R (except RV3N)		

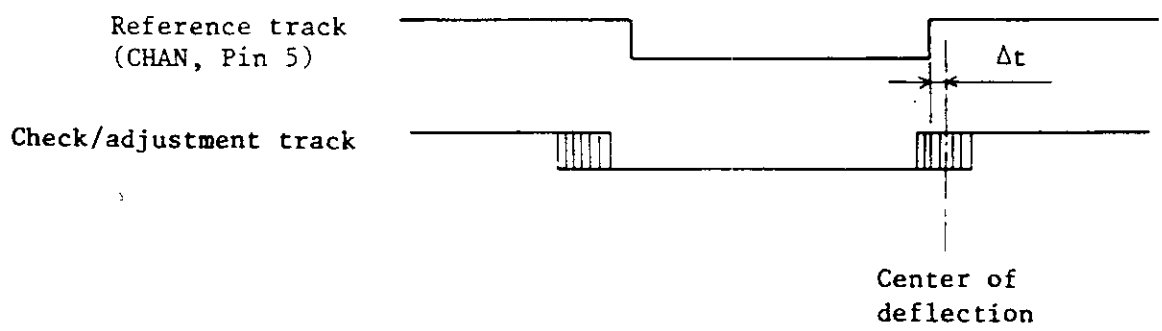


Figure K.17 Δt for check track vs. reference track (CHAN, pin 5)

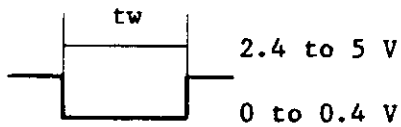
II. Check and adjust the write skew by taking the following steps:

(1) Load a good quality tape (SRM 3200 or equivalent).

(2) Write 800 fci in the NRZI mode. Set the field tester switches S0 through S7 to $89, and toggle the SSS switch.

(3) Observe the deskew clock pulse width for track 5 of the write circuit at check terminal CHCE, pin 1. Check that the clock pulse width meets the value shown in Table K.6. Adjust the pulse width for the specified value with RV1E. See Figure K.16 (K0140) for locations of potentiometers and check terminals.

Table K.6 Deskew clock pulse width adjustment

Speed	Adjusted pulse width (tw)	Observed waveform for CHCE, pin 1
75 ips (for 75/125 ips device)	3.0 µs ± 10%	
125 ips (for 125/200 ips device)	2.0 µs ± 10%	

(4) Check that the rise times of pulses for the respective tracks meet the specifications in Table K.7 when the output levels of other tracks are observed. Use the output level of check terminal CHAN, pin 5 for track 5 as a reference.

(5) Adjust the rise time with RV1A to RV1I (except RV1E).

Table K.7 Rise time check and adjustment (2)

Speed	Variable resistor	Check terminal	Specification (Δt) (See Fig. K.17 for Δt)
75 ips (for 75/125 ips device)	RV1A to RV1I (except RV1E)	CHAJ, pin 5 to CHAR, pin 5 (except CHAN, pin 5)	0.3 µs or less
125 ips (for 125/200 ips device)			0.2 µs or less

K0155	Read and Write Check and Adjustment (6250/1600/800 bpi MTU)

I. ADJUSTMENTS

A) Clean the read/write and erase head before checking adjustments.
B) Use a good quality scratch tape.
C) Check vacuum and air bearing levels per section K0190 in the Maintenance Manual.
D) Check Azimuth and adjust if necessary. See section K0120.

* Note: After the above pre-requisites have been satisfied, mount a field tester and load a good quality scratch tape.

II. ADJUSTMENTS FOR PE READ SIGNAL

1. Check and adjust read levels as shown in Table 3.

Table 3

Item		Field tester		Operation	Standards (Status of LED0 to LED8)	Remarks
Check time	At adjustment time	Code	Setting Switch name			
1	1	$1E	CNT	Set LEDs on the field tester to the TMSR0 to TMSR8 (register $1E) display mode.	— — —	
2	2	$E8	SSS	Set the tape speed to low tape speed mode.	— — —	
	3	$FA	SSS	Set the slice level to 100%.	— — —	
	4	$8D	SSS	Write 3,200 fci in the low speed PE mode.	Adjust RV1J to RV1R so that LEDs can be set to a semi-luminous status.	After adjustment, set SSS switch to on and stop the tape.
3	5	$F9	SSS	Set the slice level to 90%.	— — —	
4	6	$8D	SSS	Write 3,200 fci in the low speed PE mode.	LED0 to LED8 shall all light	After checking, set the SSS switch to on and stop the tape.
5	7	$FB	SSS	Set the slice level to 110%.	— — —	
6	8	$8D	SSS	Write 3,200 fci in the low speed PE mode.	LED0 to LED8 shall all be off	After checking, set the SSS switch to on and stop the tape.

Notes:
1. A semi-luminous status is intermediate between the going-out and the most luminous status of a LED.
2. The word "lighting" refer to a status other than going-out.
3. The correspondences between LED0 to LED8 and RV1J to RV1R are as follows:

Variable resistor	RV1J	RV1K	RV1L	RV1M	RV1N	RV1O	RV1P	RV1Q	RV1R
Track No.	1	2	3	4	5	6	7	8	9
LED No.	5	7	3	8	2	1	0	6	4

III. ADJUSTING OF NRZI READ SIGNALS

1. Adjust the NRZI read signals according to Table 1.

Table 1

Item		Field tester		Operation	Standards	Remarks
At Check time	At adjustment time	Code	Setting switch name			
1	1	$89	SSS	Write 800 fci in the NRZI mode.	Adjust RV2J to RV2R so that terminals CHAJ-1 to CHAR-1 can develope the following value: 2.0 Vp-p ± 10% (against the grounding). Use an oscilloscope for observation.	

Note:
Mounting position of check terminal and variable resistors, is shown in Figure 1.

4. Mounting position of check terminal and variable resistors is shown in Figure 1.

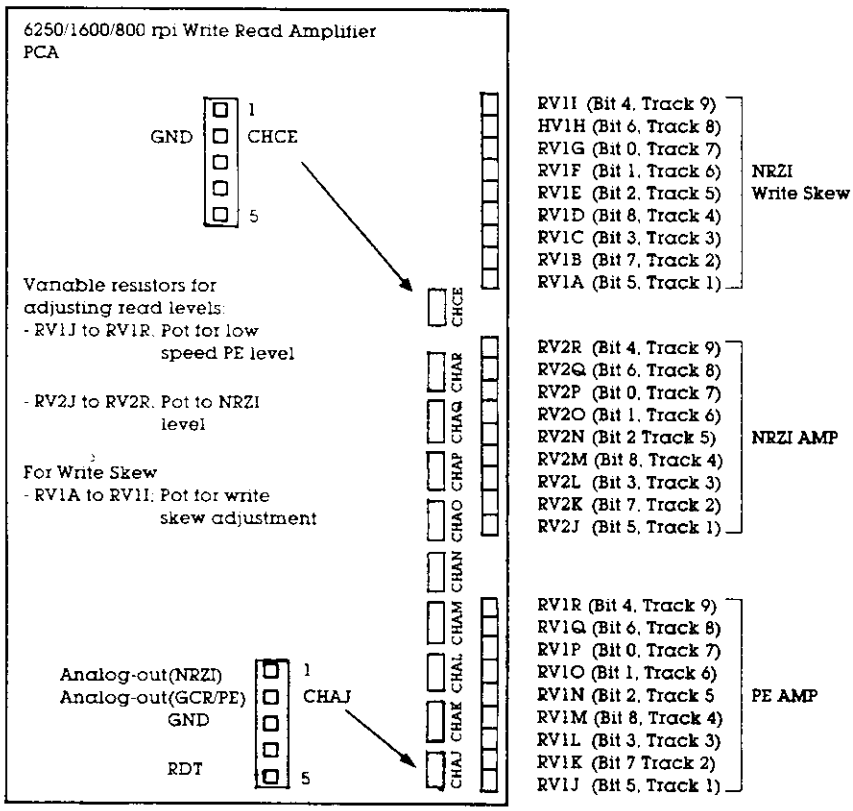


Figure 1 Variable resistors and check terminals for 6250/1600/800 rpi

IV. ADJUSTING NRZI WRITE SKEW

1. Measure read skew by taking the following steps:
   a) Mount a field tester n C05.
   b) Load a standard master skew tape, check that the file protect lamp on the operator panel is illuminated.
   c) Run the tape forward in NRZI mode. (see table 6)
   d) Measure the time difference against the reference track. (see figure 5)

      Note: The measurement will be used later.

2. Write Skew Adjustment
   a) Load a good quality scratch tape.
   b) Write 800 FCI in NRZI. (see table 7)
   c) Reference track deskew pulse width check/adjustment.

      Observe the deskew clock pulse width for track 5 of the write circuit at check terminal CHCE-1 and check that the clock pulse width falls into the value shown on Table 8.

   d) Adjustment

      Check the waveform of another track after triggering off the reference track (CHAN-5). At this time, adjust values RV1A to RV1I (except RV1E) to the rise time difference between reference track and another track to Δt_R measured when reading skew tape.

V. RUN ALL INTERNAL DIAGNOSTIC

1. Run A8 Diagnostics ensuring all three densities have been displayed.

Table 6

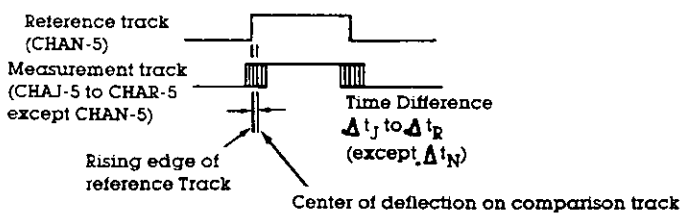
Item	Field tester		Operation	Remarks
	Code	Setting switch name		
1	$E0	SSS x 2	Set to the NRZI mode.	Turn on twice
2	$01	SSS	Forward running	The tape stops running if a BOT or an EOT is detected.
3	41	SSS	Reverse run	Do not use rewind

Table 7

Item	Field tester		Operation	Remarks
	Code	Setting switch name		
1	$89	SSS	Set to the NRZI Write.	

Table 8

Speed	Adjusted pulse width (tw)	Observed waveform
75 ips	3.0 ± 0.3 μs	CHCE-1 tw 2.4 to 5V 0 to 0.4 V
125 ips	2.0 ± 0.2 μs	



Note:

Trigger the check point CHAN-2 (analogue out put) to become avoe waveform

Figure 5

K0160	Check for Write Voltage

(1) Connect a field tester and load a good quality tape (SRM 3200 or equivalent).

(2) Set the field tester to the write mode (in phase encode mode), erase mode, or read mode, as shown in the table below.

(3) Check for voltage at each check point shown in Figure K.18.

MTU type	Revision of PCA	Check point	Write mode		Erase mode	Read mode
			$E9 (SSS) $8B (SSS)	$EC (SSS) $8B (SSS)	$83	$A2
6250/ 1600 bpi	All units	CHWR, pin 6	11.2 ± 1 V	---	Max. +0.4 V	Max. +0.4 V
	WRHMU WR1MU (B)	CHWR, pin 8	5.6 ± 0.4V	---	Max. +0.4 V	Max. +0.4 V
	WR1MU (E)		5.2 ± 0.4V	5.8 ± 0.4V		
	All units	CHWR, pin 10	2.4 ± 0.4V	---	2.4 ± 0.4 V	Max. +0.4 V
1600/ 800 bpi	All units	CHWR, pin 6	10.5 ± 1 V	---	Max. +0.4 V	Max. +0.4 V
	All units	CHWR, pin 10	2.4 ± 0.4V	---	2.4 ± 0.4 V	Max. +0.4 V

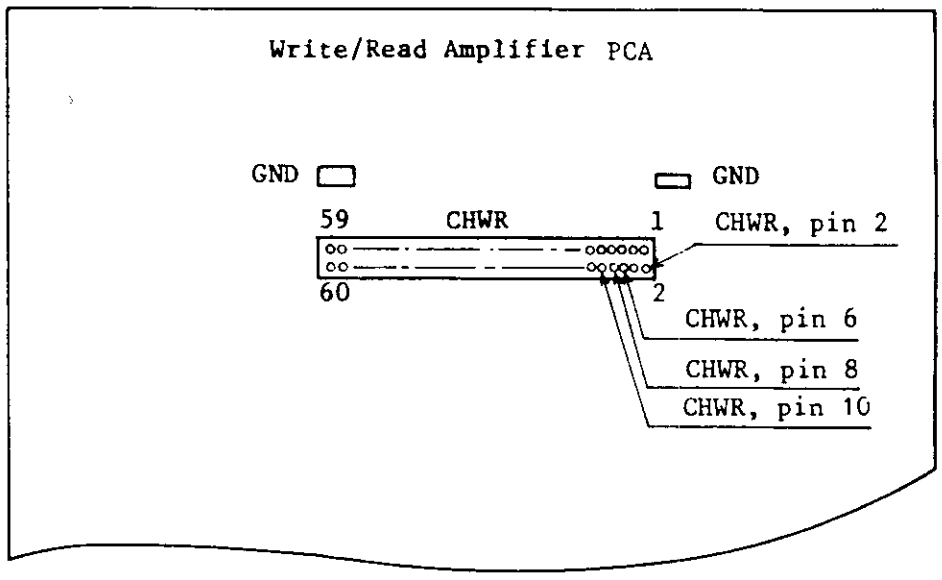


Figure K.18 Check points for write voltage on write/read PCA

K0170	Check for Erase Effect

(1) Prepare a tape onto which all "1's" have been written in the 1600 phase encode mode.

(2) Connect a field tester and load the tape.

(3) Erase the tape content by issuing an erase command from the field tester (command code $83).

(4) Read the tape content, and check that the output levels at the respective check points meet the following specifications. Locations of check points are shown in Figure K.15 (see K0130 for 6250/1600 bpi MTU) and in Figure K.16 (see K0140 for 1600/800 bpi MTU).

MTU type (bpi)	Read mode (code)	Check points	Allowable range
6250/1600	Phase encode ($E0, $01)	CHAJ, pin 1, to CHAR, pin 1	40 mVp-p maximum
6250/1600/800	Phase encode ($E2, $01)	CHAJ, pin 2, to CHAR, pin 2	

K0180	Hose and Tube Check

(1) Visually check to ensure that no cracks or abrupt bends, kinks, or other obvious problems exist on the hoses and tubes.

(2) Check for loose connections of tubes (between the hoses and capacitive sensor) or disconnected tubes.

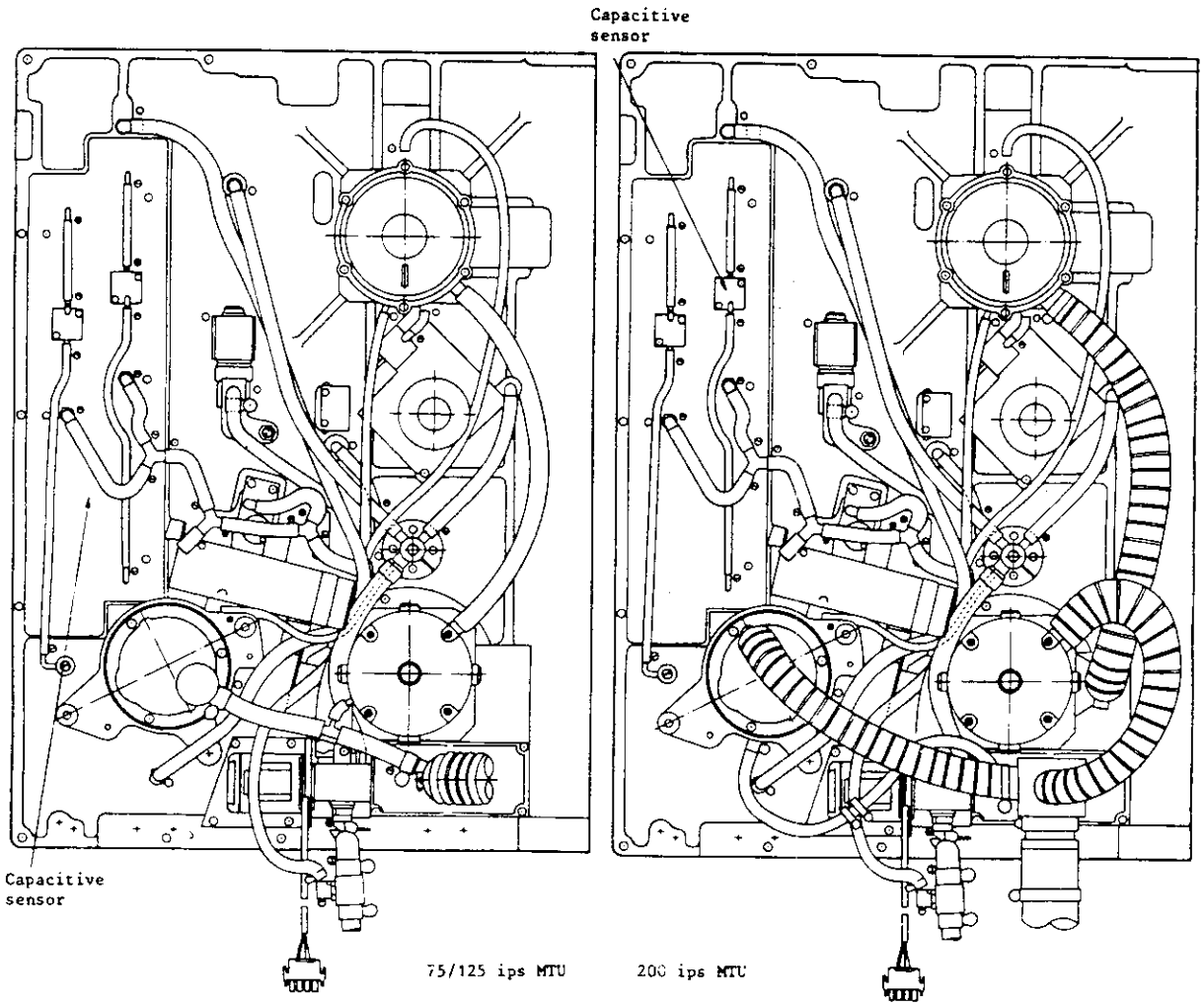


Figure K.19 Location of capacitive sensor

K0190	Check and Adjustment of Pressure and Vacuum Levels

Load an SRM3200 tape or a tape of equivalent quality as follows:

(1) Install the reel of tape on the file (upper) reel.

(2) Position the tape leader between the two white scribe marks on the upper restraint. (For a cartridge, omit this step.)

(3) Close the door.

(4) Press the LOAD/REWIND button on the MTU front panel.

The air system (pneumatics) will now come on, the window will close, and the file reel will rotate clockwise (CW) to feed the tape. Tape will load into columns, search forward, search backward, and stop at beginning of tape (BOT). If the 2-digit display on the MTU operator panel is other than 00, refer to the MTU error codes in Section A of this Maintenance Manual.

To allow for thermal stabilization, the pneumatics assembly must operate for at least 30 minutes before adjustment. Use pressure gauge B91L-0020-0001A and vacuum gauge BMz 198a for the following checks. Repeat the procedures in the following sequence for each MTU and whenever vacuum/pressure adjustment is made.

Column Vacuum

(1) Remove the white nylon screw from the column vacuum measuring port shown in Figure K.20.

(2) Connect the vacuum gauge to the column vacuum measuring port.

(3) Refer to the pressure check level in the table below for column vacuum.

(4) If necessary, adjust the vacuum restrictor so that vacuum pressure is within air pressure adjustment level listed.

Air pressure specifications

Check point	Air pressure check levels (mm H_2O)	Air pressure adjustment levels (mm H_2O)
Column vacuum	950 $\pm$ 100	950 $\pm$ 50
Air bearing pressure	2600 $\pm$ 100	2600 $\pm$ 50
Restraint pressure	450 $\pm$ 50	450 $\pm$ 20

K0190	Check and Adjustment of Pressure and Vacuum Levels

Air-Bearing Pressure

Air-bearing pressure check requires tape to be fully loaded into columns.

(1) Ensure that field tester ONL/OFL switch is set to OFL. Set field tester switches S0 through S7 to $01 and toggle the SSS switch.

(2) Remove the white nylon fitting and connect the pressure gauge to the air-bearing measuring port.

(3) Refer to the pressure check specification in the table above for air-bearing pressure.

(4) If necessary, adjust the pressure-relief valve shown in Figure K.20 until the pressure is within the air bearing pressure adjustment level listed.

Restraint Pressure

(1) Press the UNLOAD button on the MTU front panel.

(2) When rewinding is complete, remove the tape from the file reel hub.

(3) Mount the pressure-adjustment tool (B960-0110-T026A) on the air outlet of restraint member.

(4) Connect pressure gauge (B91L-0020-0001A) to the restraint member pressure port.

(5) Set field tester switches to $A5 and toggle the SSS switch.

(6) Refer to the pressure check specification in the table.

(7) If necessary, adjust the distributor screw until pressure is within restraint pressure adjustment specification.

(8) Toggle the SSS switch on the field tester to turn the air system off.

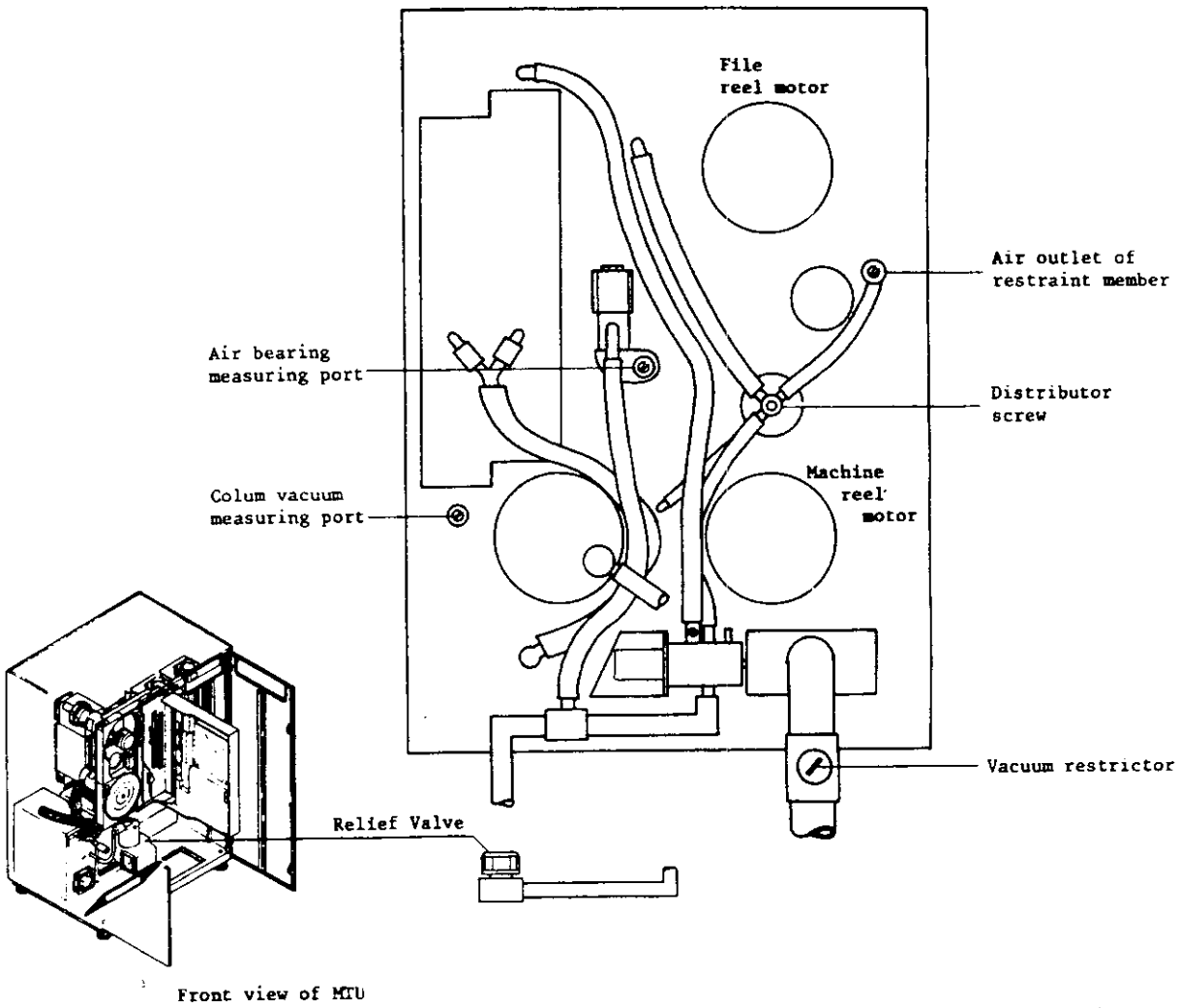


Figure K.20 Pressure check and adjustment points

K0191	Frequency Setting

(1) Confirm whether facility input frequency is 50 or 60 Hz.

(2) Access the power supply unit rear panel from the front of the MTU.

(3) For 60-Hz input, verify that CNP66 is connected to CNJ66B and that CNP66C is connected to CNJ66A. These connections are shown in Figure K.21.
or
For 50-Hz input, verify that CNP66 is connected to CNJ66A and that CNP66C is connected to CNJ66B. These connections are also shown in Figure K.21.

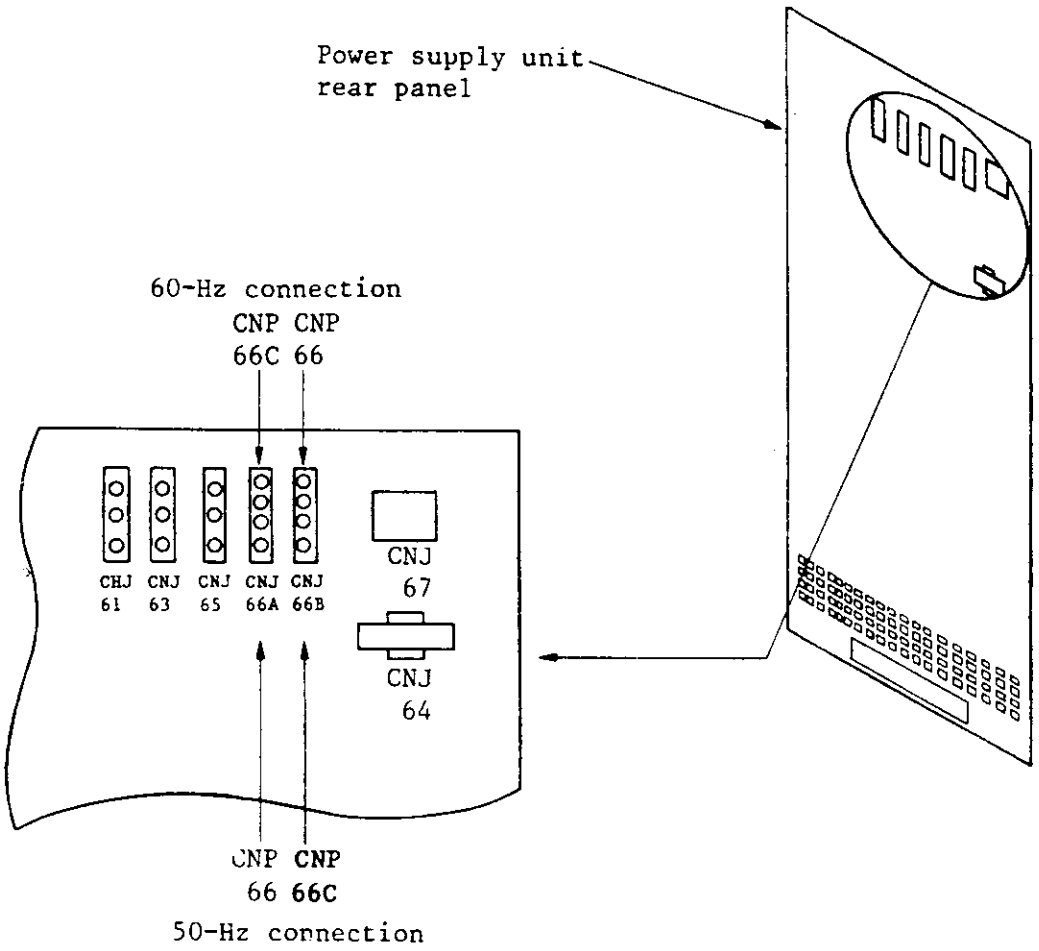


Figure K.21 Input power frequency setting

K0191	Frequency Setting

Figure K.22 shows the location of pulleys for the vacuum blower and the air-pressure pump on the air supply unit. These pulleys are dependent on input-power frequency (50 or 60 Hz). The vacuum blower pulley is also dependent on altitude.

Caution: Do not remove or install belts by prying with shop tools. Use the adjustment screws on the air supply unit to loosen pulleys and belts. Use tension tool (B96L-0110-0004A) to adjust belt tension.

A. Vacuum Blower Pulley

(1) Verify that the correct frequency-dependent pulley has been installed in accordance with Table K.6. When delivered, the device is pre-set for either 50 Hz or 60 Hz input. For 50-Hz input, use P/N B30L-1940-0101A; for 60-Hz input, use P/N B30L-1940-0102A.

Note: Above 6,000 ft. use special order pulley part number according to frequency.

(2) Verify that the correct altitude-dependent pulley has been installed. If the unit operates at an altitude above 3000 feet, install the vacuum blower pulley in accordance with Figure K.23 and Table K.8.

Table K.8 Input-frequency and altitude adjustment

VACUUM BLOWER PULLEY		
Altitude	Part Number (50HZ)	Part Number (60HZ)
0-3,000 ft.	B30L-1940-0101A (Large diameter)	B30L-1940-0102A (Large diameter)
3-6,000 ft.	B30L-1940-0101A (Small diameter)	B30L-1940-0102A (Small diameter)
6-10,000 ft.	B30L-1940-0112A	B30L-1940-0113A

(3) Remove the pulley, reverse its orientation, and reinstall.

(4) Check and adjust belt tension (K0200).

(5) Check and adjust pressure and vacuum levels (K0190).

B. Motor Pulley

The motor pulley driving the air pump can be oriented for operation at either 50 or 60 Hz, as shown in Figure K.23 and Table K.6. If the MTU operates on 50 Hz, connect the belt to the large diameter pulley. If the MTU operates on 60 Hz, connect the belt to the small diameter pulley. Check and adjust belt tension (K0200) and pressure and vacuum levels (K0190).

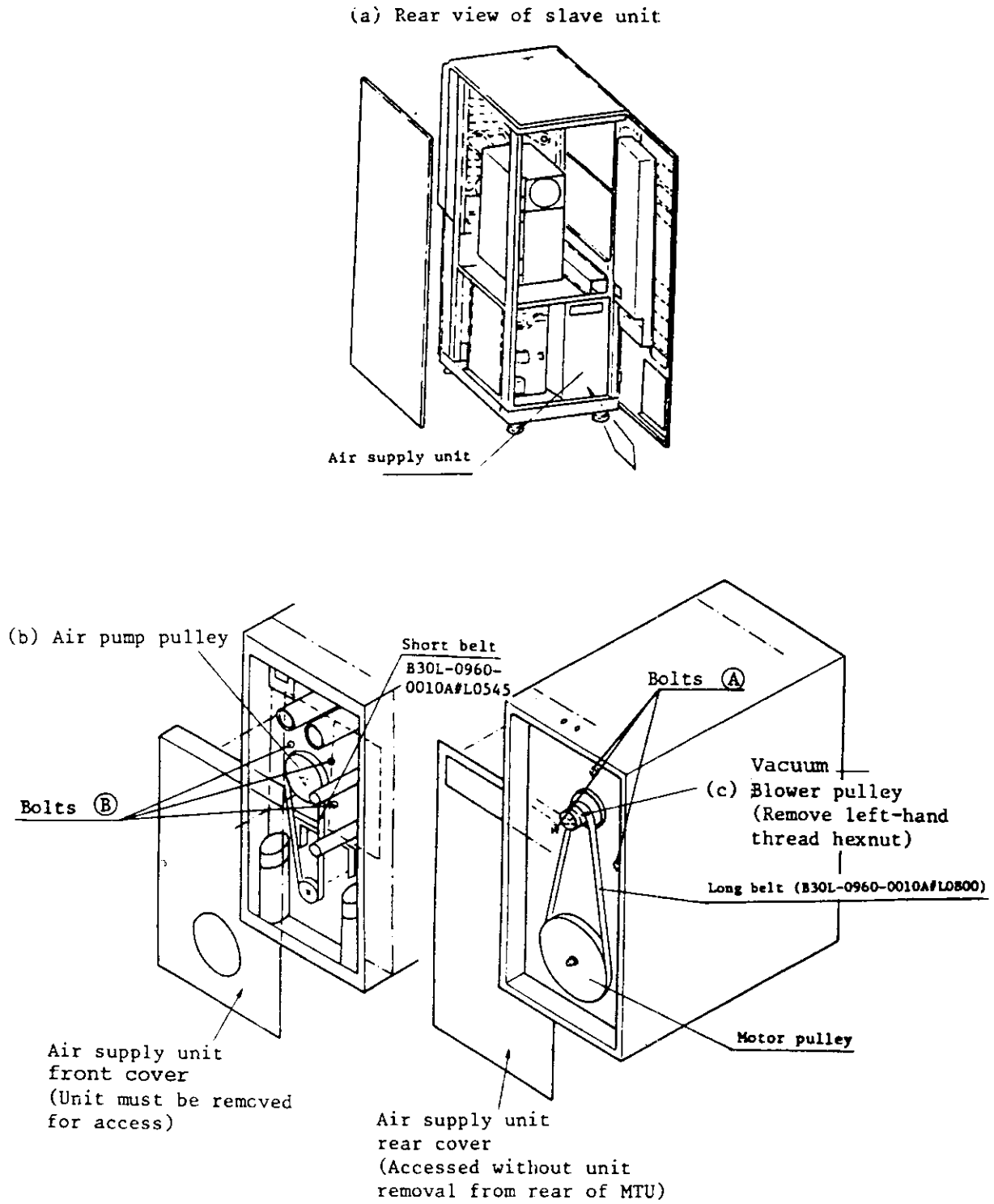


Figure K.22 Air supply unit: vacuum blower and motor pulleys (1)

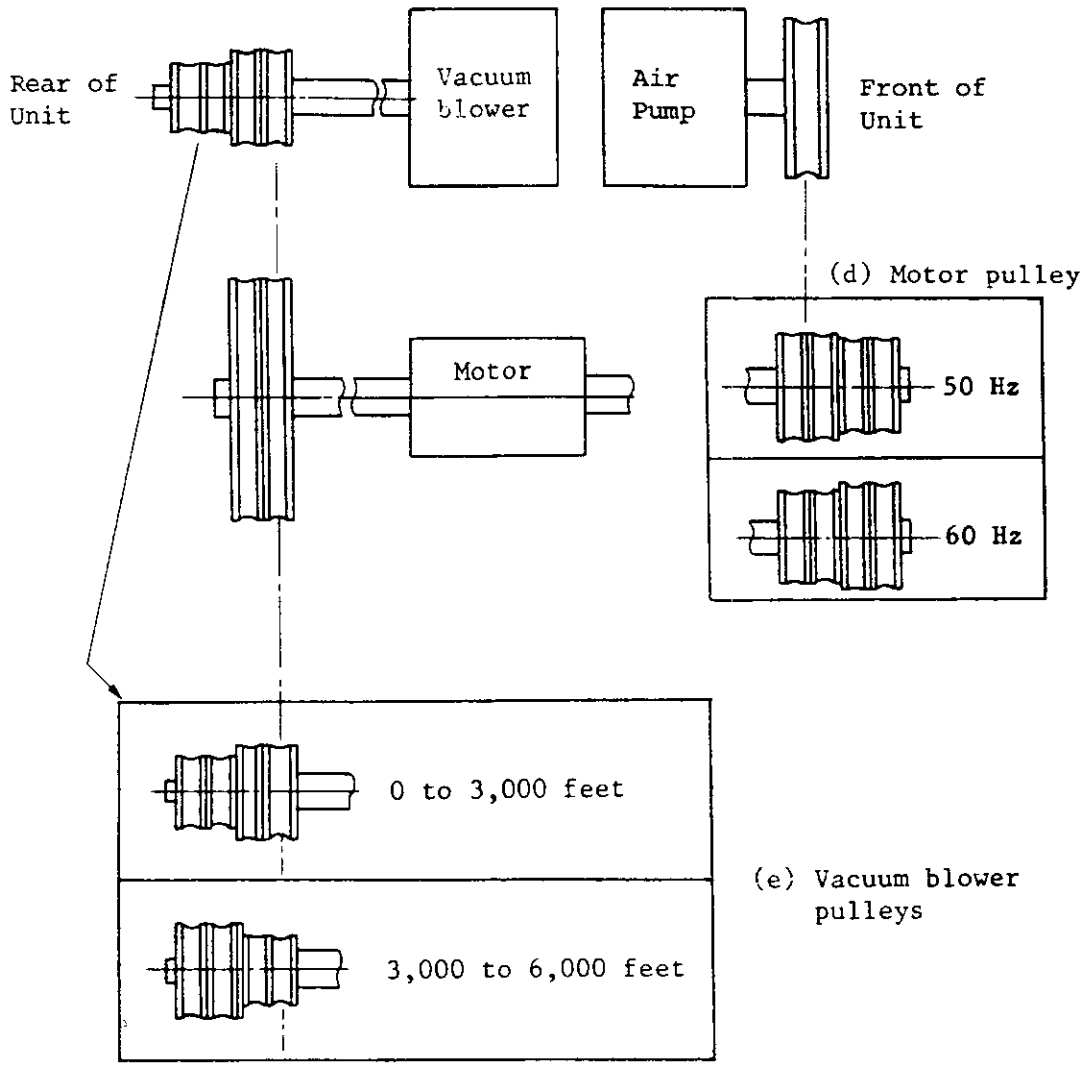


Figure K.23 Air supply unit: vacuum blower and motor pulleys (2)

K0200	Belt Tension Check and Adjustment

(1) Remove the MTU air supply unit (L0400).

(2) Remove the air supply unit front and rear covers and refer to Figure K.22 for location of belts.

(3) Install the tension meter, as shown in Figure K.24. Turn the motor pulley 3 to 5 turns by hand before measuring the tension. Push up the lever with a finger as shown in Figure K.24. Snap the belt. Read the value in pounds when the belt hits the tension meter (at location "A").

(4) Adjust the belt tension by positioning the vacuum blower or air pump.

- o If the belt is to be replaced, the new belt must be adjusted so that the tension levels in Table K.9 are satisfied.
- o If the old belt is to be used again, measure the tension before removing it, and adjust the belt to that tension when reinstalling it. The direction of rotation of the belt must be the same when reinstalling it.

Table K.9 Belt tension

Belt	Minimum tension	Adjusted value	
		New belt	Old belt
Belt between motor and vacuum blower (longer belt)	16.5 lbs.	29 to 34 lbs.	Original tension (refer to Note 2)
Belt between motor and air pump (shorter belt)	12.5 lbs.	29 to 34 lbs.	

Notes: 1. Belt tension rapidly deteriorates in several days or several months. Replace the belt if Table K.7 requirements are not met.

2. If an old belt has been stretched, its life may be extremely short if its tension is adjusted to the value for a new belt. Replace old belt as soon as possible.

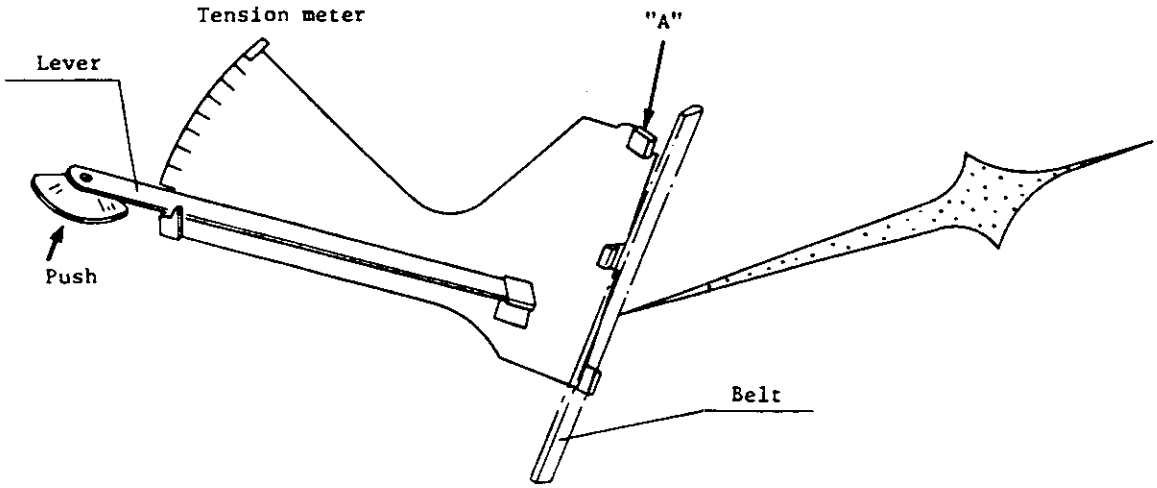


Figure K.24 Tension meter

(1) Obtain a magnetic tape and install two new reflective markers as shown in Figure K.25.

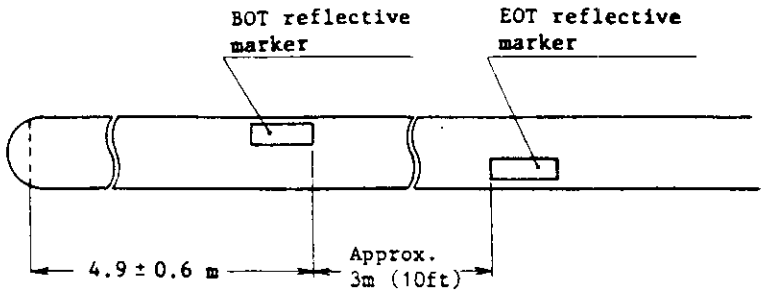


Figure K.25 Beginning of tape and end of tape reflective markers

(2) Before loading tape, check the voltage levels at terminals BOT/GND and EOT/GND (see Figure K.26) with a digital voltmeter.

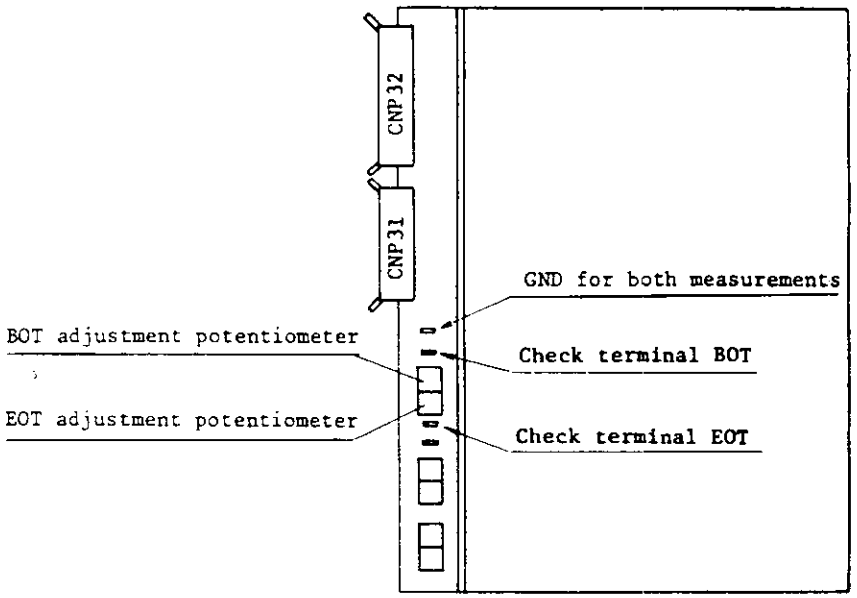


Figure K.26 MTU PCA 1A04

(3) If voltage is not +2.0 V, adjust potentiometers for BOT and EOT, respectively, on the MTU PCA 1A04.

(4) Mount the tape and press LOAD/REWIND button on the MTU front panel.

(5) After the tape automatically stops at BOT, measure the voltage at the BOT terminal.

(6) If the level is lower than +2.0 V, adjust the level to +2.0 V using BOT potentiometer.

(7) Set the field tester switch to $01.

(8) Toggle the SSS switch to run the tape forward. Tape automatically stops at EOT.

(9) Measure the voltage level at the BOT terminal and adjust voltage to lower than +0.3 V.

(10) Measure the EOT level.

(11) If EOT level is lower than +2.0 V, adjust the level to +2.0 V using potentiometer EOT.

(12) Set the field tester switches to $41.

(13) After the tape automatically stops at BOT, check that the EOT level is lower than +0.3 V.

(14) Repeat these steps for each MTU in the system.

K0220	Check of Low Tape Detection Circuit

Check the low tape detection circuit as follows:

(1) Unload the tape and connect the field tester to the MTU at 1C05.

(2) Set the field tester to machine reel FWD (command code D2).

(3) Check that the output voltage on the MTU logic gate motherboard (location AB8) is +1.4 Vp-p or more, as shown in Figure K.27.

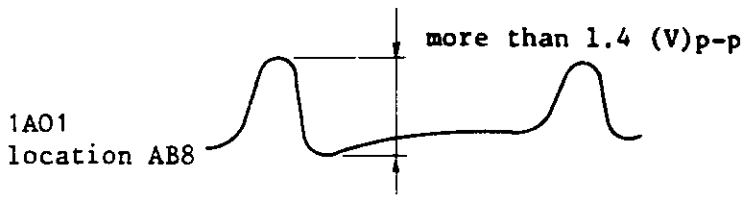


Figure K.27 Low tape output

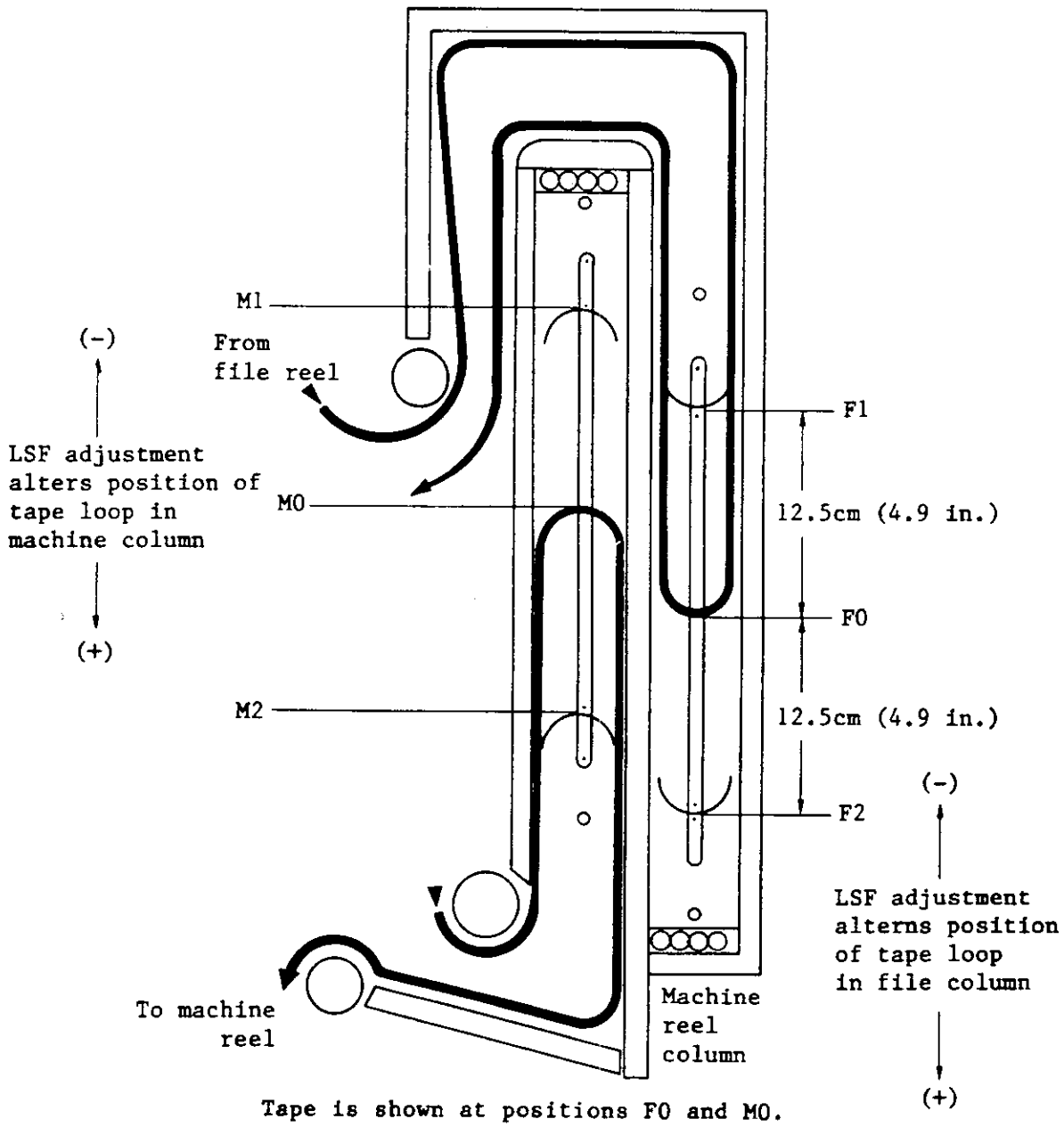
K0240	Check and Adjustment of Tape Loop Position Detection Circuit

(1) Place tape reel on auto hub and press the LOAD/REWIND button on the MTU front panel.

(2) As the tape loop starts to appear in the columns, press the RESET switch on the MTU front panel.

(3) Set field tester switches S0 through S7 to $A8 and the OFL/ONL switch to OFL. Toggle the SSS switch. This turns on the air pressure.

(4) Manually adjust the tape inside the column to positions F0 and M0 shown in Figure K.28. Hold the file reel in place by taping the reel to the column door.



Tape is shown at positions F0 and M0.

Figure K.28 Tape loop positions

(5) Measure the voltage between LSF (Figure K.29) and ground. Adjust potentiometer RV1F so that the voltage is 0±0.2 Vdc.

(6) Measure the voltage between LSM and ground. Adjust potentiometer RV1M so that the voltage is 0±0.2 Vdc.

(7) Set the field tester switches S0 through S7 to $AA. This will cause the capstan to move and reposition the tape loop to positions M1 and F1 as shown in Figure K.28.

(8) Measure the voltage between LSF and ground. Adjust potentiometer RV2F so that voltage is 6.5±0.2 Vdc.

(9) Measure the voltage between LSM and ground. Adjust potentiometer RV2M so that the voltage is 6.5±0.2 Vdc.

(10) Set the field tester switches S0 through S7 to $AB. This will cause the capstan to move and reposition the tape loop to positions M2 and F2 as shown in Figure K.28.

(11) Measure the voltage between LSF and ground. Adjust potentiometer RV2F so that the voltage is no lower than 6.5 Vdc and no higher than 8.5 Vdc.

(12) Measure the voltage between LSM and ground. Adjust potentiometer RV2M so that the voltage is no lower than 6.5 Vdc and no higher than 8.5 Vdc.

(13) Toggle the SSS switch on the field tester to terminate the test.

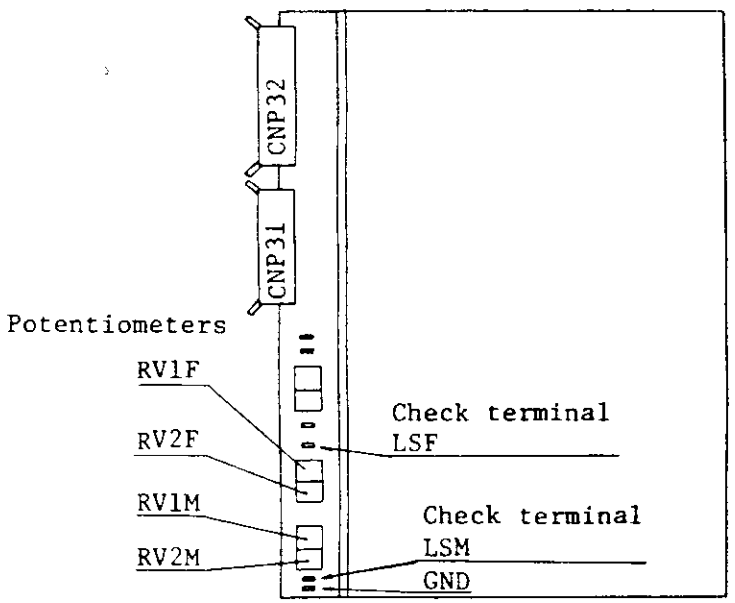


Figure K.29 MTU PCA 1A04

K0260	Check and Adjustment of File Protection Mechanism

Check and adjustment of the file protection mechanism is performed by confirming the position of the pin head of the file protection in both (1) a normal state (no tape loaded or tape without a write enable ring loaded) and (2) when magnetic tape with the write enable ring is loaded.

(1) Normal state (no tape loaded or tape without a write enable ring loaded).

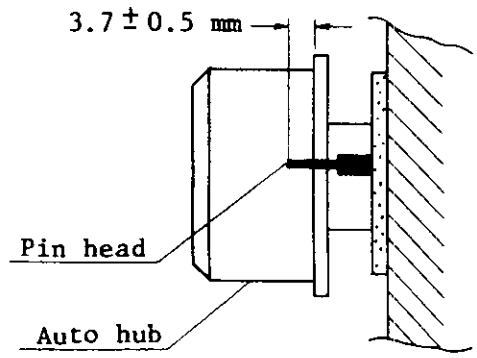


Figure K.30 File protection pin head position (1)

(2) Magnetic tape with write enable ring is loaded. Push the pin head as far as the flange surface and press the LOAD/REWIND button. Check that the distance between flange surface and pin head is 2.5 mm or more. If incorrect, the file protection mechanism must be replaced.

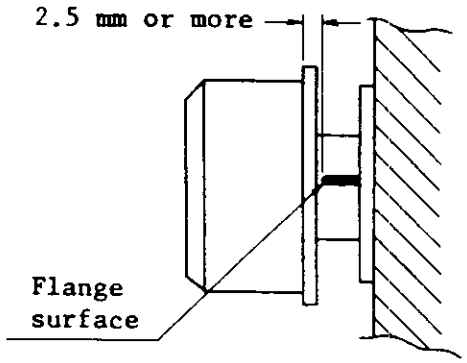


Figure K.31 File protection pin head position (2)

(3) Push the pin head by hand. Check that the microswitch is actuated before the pin point is moved 1 to 2.8 mm. If not actuated, remove the file protection mechanism from the panel and adjust the position of the microswitch.

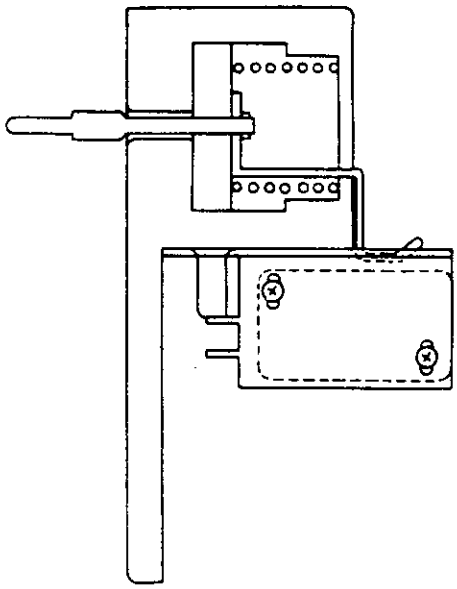


Figure K.32 File protection mechanism

K0290	Check of Autocleaner

(1) The autocleaner can be positioned with the guide pins on the magnetic head, as shown in Figure K.33.

(2) Check that the ribbon is taut and is properly mounted on the ribbon guide and slide part.

(3) If ribbon is loose, depress the load button after turning the power on. When the motor turns automatically, the sag is eliminated.

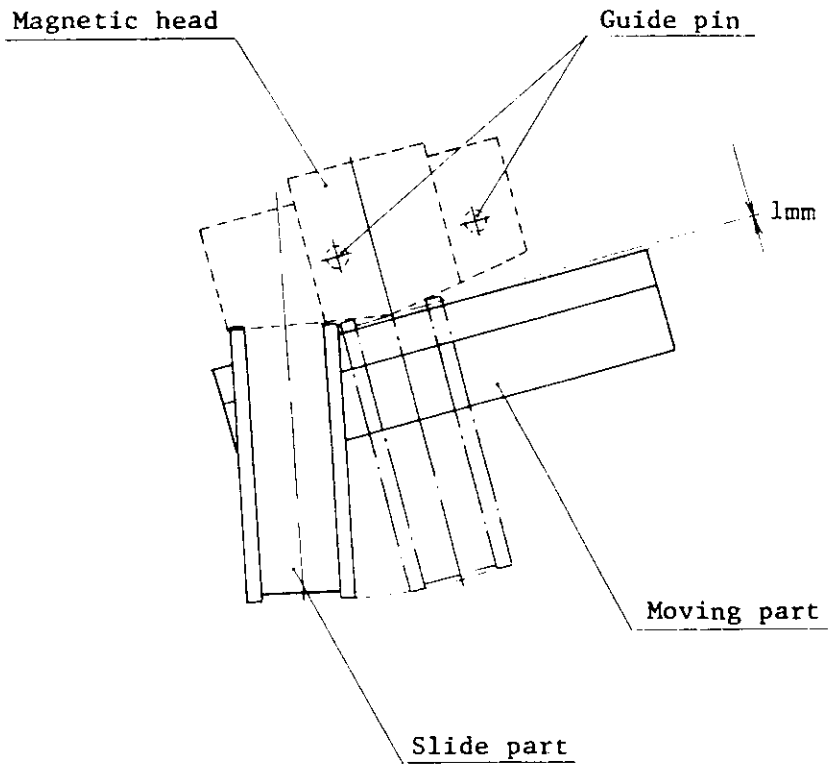


Figure K.33 Magnetic head and autocleaner